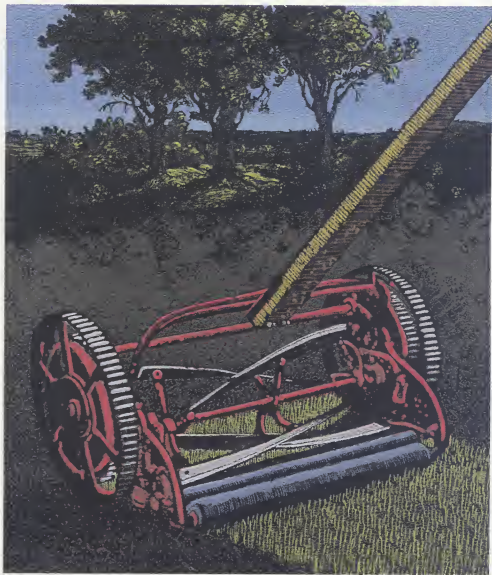


LOTUS

COMPUTING FOR MANAGERS AND PROFESSIONALS

MAY 1989 \$3.00



EIGHT BETTER WAYS TO GET THE JOB DONE

WORD PROCESSING SOFTWARE THAT MANAGERS CAN ABSORB INSTANTLY.



Busy professionals need a word processor which will quickly soak up their ideas and help them create impressive-looking documents. New from Software Publishing, Professional Write 2.1 incorporates all the features managers want into an easy to use program.

FOR FREE TRIAL DISK
CALL 1-408-648-4391
• OPERATOR 86 •
FOR UPGRADE INFO
CALL 1-303-795-4900

Follow-along tutorials, pull-down menus and context-sensitive help will have managers pouring out memos and reports in less than an hour with no special training or MIS support. What's

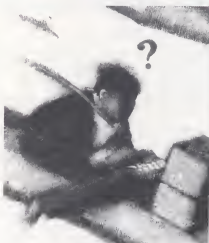
more, its Preview feature wipes out wasted printing runs by showing what a report will look like before it's printed. Professional Write even shares files with other popular word processing programs. And supports high quality laser and dot matrix printers, providing managers access to a flood of fonts. So call today for a free trial disk. Professional Write will have managers instantly producing sophisticated documents, instead of wringing their hands over complicated software.

SPC SOFTWARE
PUBLISHING
CORPORATION

LOTUS



58 *Solve business problems: a pop quiz*



30 *More letters to the Macros editor*



70 *How do groups work together?*

FEATURES

44 **PUSHING 1-2-3 TO ITS LIMIT . . . AND BEYOND**

Conoco must rework part of its executive information system.
BY CHRIS BROWN

48 **EIGHT BETTER WAYS**

Here are tools to help you save time, memory, and keystrokes on routine worksheet tasks.

BY DOUGLAS COBB AND STEVEN COBB

54 **HOW TO DIVVY UP OVERHEAD ALLOCATIONS**

Two ways to assign indirect costs to your firm's product lines.
BY STEPHEN L. NELSON

58 **SPREADSHEET CHALLENGE**

Figure out the solutions to these business problems.
BY PAULA DEMPSEY

65 **A FINANCIAL CALCULATOR THAT DOES IT ALL**

This unique template picks up where the @functions leave off.
BY JACOB HESKES

70 **BEHIND THE HYPE FOR GROUPWARE**

The software has users, but its promise rests on shaky assumptions.
BY LINDSY VAN GELDER

76 **TO BUY OR NOT TO BUY**

Owning your own home is the American Dream. Is it profitable?
BY STEPHEN L. NELSON AND SUSAN R. NELSON

4 **STAFF LETTER**

6 **LETTERS**

10 **@LOTUS**

12 **IDEAS AND TRENDS**

Spreadsheet Wars; Fast PCs;
Interview: Therese Myers; Dow
Jones Database; Applications into
Silicon; Shorts

26 **START HERE**

An Introduction to Menus
BY DANIEL GASTEIGER

MACROS

30 **1-2-3 MACROS**

Macro Letters
BY NICK DELONAS

36 **SYMPHONY MACROS**

From the Pointer's View
BY NICK DELONAS

RESOURCES

82 **Q&A**

88 **GOOD IDEAS**

REVIEWS

92 **Ready-to-Run Accounting for 1-2-3**

BY STEPHEN L. NELSON

100 **DeskJet vs. BubbleJet**

BY MARC DAVIDSON

102 **Hard Disks To Go**

BY PETER G. AITKEN

104 **ADVERTISER INDEX**

104 **EDITORIAL EVALUATION**

104 **READER SERVICE CARD**

105 **NEW PRODUCTS**

Send-Off! and *Budget Express*

112 **ESSAY**

Lotus's Next Challenge
BY JEFFREY TARTER

COVER: BOB CONGE

Spreadsheet Rivalry Heats Up

to meet the
nal com-
officials
the new
finally ap-
ul that the
ent ver-
ling in-
a long
o'ny

products are not enough if soft-
ware is not displayed in com-
puter stores.

"Things are getting down and dirty," a computer analyst observes.

Dealers who have seen what will be
new promo-

The Spreadsheet Market

OTHER 6.1%



**RACE O
VS. POS**

We Interrupt T War For This Im

To all those unlucky enough to be stuck smack in the middle of the current spreadsheet confusion, take heart.

There is, at last, a viable alternative to war: revolution.

One that delivers even more performance than you have (ahem) been waiting for, but without demanding expensive new hardware or extensive retraining. And without abruptly cutting you off from any user in your company, even those on mainframes.

The name of the spreadsheet is SuperCalc® 5.

And what it can do for you is, frankly, quite revolutionary.

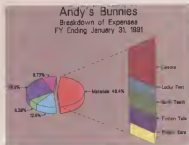
Let's begin at the end. Stand-alone quality graphic capabilities have been built in.

Offering hundreds of presentation treatments from word charts to three-dimensional bar, pie, scatter, and polar graphs.

And with SuperCalc5, you select fonts, lines, boxes, grids and shading. All of which can be used to produce the highest quality customized reports.

Plus, SuperCalc5 actually makes productivity easier. An integrated Undo feature simply reverses unwanted commands. And a truly comprehensive system of debugging highlights costly errors and analyzes macro logic.

Perhaps even more impressive



Present a state-of-the-art picture of your work.

Andy's Bunnies					
Quarter 1 Results					
	North	South	East	West	Total
Food	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Shelter	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Entertainment	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Transportation	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Utilities	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Other	\$14,400	\$18,000	\$18,000	\$18,000	\$68,400
Total	\$86,400	\$108,000	\$108,000	\$108,000	\$410,400

Link just about everything in sight.

is the way SuperCalc5 can link spreadsheets. Up to 255



Catch bugs before they come back to bite you.

**POWER
TION**

the field had been ranked and the odds
mal computer spreadsheet software. a

Mass. — Lo
red to fight the
war with sweep-
its reseller pro

**New program
es to fend off
spreadsheet war**

• A restructuring
MIF plan. The
aining coun
phaz

**Spreadsheet
Ready to Pounce**

January 28, 1989

**at Gains
on Riva**

creating a spreadsheet, h
ination of

The Spreadsheet portant Update.

to be precise. Linking either in memory or on disk, either pages of the same spreadsheet or independent, either SuperCalc5's files or Lotus® 1-2-3®'s.

Which brings us to the "L" word. SuperCalc5 not only reads and writes Lotus® 1-2-3® files, it totally coexists with Lotus.

and compatible computers but also takes full advantage of 286 and 386 machines when you decide to make that transition.

And if all that isn't enough to make you run out today and join the revolution, there's even more incentive.

Like our free demo disk offer through July 31, 1989. And our \$100 upgrade offer for just about any spreadsheet you're using. Call 1-800-531-5236. In Canada call 1-800-663-6904.

Which finally brings us to our admittedly biased outlook for the much touted spreadsheet war. With SuperCalc5, peace is at hand.

Andy's Bunnies

Income Statement
FY ending January 31, 1981
(Unaudited)

Revenue		
Sales	\$1,778,423	\$1,849,047
Other	10,000	10,000
License Revenue	1,440,000	1,440,000
Other License Fees	328,423	399,047
Total Revenue	\$3,356,846	\$3,698,094
Cost of Sales		
Shipping Inventory	\$666,250	\$666,250
Production	1,000,000	1,000,000
Shipping	100,000	100,000
Total Cost of Sales	\$1,766,250	\$1,766,250
Gross Profit	\$1,590,596	\$1,931,844
Operating Expenses		
Low selling, general and administrative	\$666,887	\$666,887
Depreciation	100,000	100,000
Other income and expense	100,000	100,000
Total Operating Expenses	\$866,887	\$866,887
Operating Income	\$723,709	\$1,064,957
Provision for income taxes	\$100,000	\$100,000
Deferred income taxes	\$100,000	\$100,000
Net income (loss) for period	\$523,709	\$864,957

Produce annual-report quality output everyday

Letting you easily move 1-2-3 macros into SuperCalc5 and back again. Even toggling between menus is a snap for SuperCalc5.

But not for Excel®.

Which now brings us to the "E" word. Unlike Excel, SuperCalc5 runs on all IBM®

Microsoft, IBM is a registered trademark of International Business Machines.



CIRCLE 101 ON READER SERVICE CARD

**COMPUTER
ASSOCIATES**
Software superior by design.

LOTUS

Editorial Director
John B. Campbell

Managing Editor
Eleanor McCarthy

Section Editors

Features
Chris Brown, Senior Editor
Ideas & Trends
Rich Friedman, Senior Editor
Resources
Dick Rudington

Art Director
Jill Winicker, Acting

Assistant Art Director
Jill Thompson

Production Editor
Kathy Minnix

Associate Editors
Applications, Richard Cranford
Techniques, Phyllis A. Sharon

Contributing Editors
Daniel Gasteiger
Stephen L. Nelson

Technical Editor
Carrie Thomas

Assistant Editors
Ideas & Trends, Jennifer Smith
Macros, Nicholas Delonas
Resources, Sue Ellen Hendershot,
Mark Scapuzza
Technical, Cynthia G. Fitzgerald,
Carol White

Copy Editors
Janet H. Mowham
Arlene G. Richmond
Assistant Copy Editor
Katherine Koerner
Research Editor
Phyllis L. Greenberg
Assistant Production Editor
Alice H. Nungun
Editorial Assistant
Administration, Claudia Russo

Publisher
Mark D. Flanagan
Executive Administrator
Ruth Hawryluk

Associate Publisher/Sales Director
James R. Pierce
Marketing Director
Robert M. Hodgson
Marketing Services Manager
Rosemary Milled
Market Research Assistant
Elizabeth Jensen

Associate Publisher/Circulation Director
Elizabeth Folsom
Circulation Manager
Linda J. Gill
Subscriber Services Manager
Jeane Nisbet
Subscription Promotion Manager
Marcy A. Geller
Circulation Assistant
Robin Riner

Business Analyst
Raymond J. Parisi Jr.
Business Manager/Production Director
Mary Ellen Birel
Production Assistant
Kirstine Benoit

Publishing Assistant
Joan E. Swarms

Lotus Publishing Corporation
President

Mark D. Flanagan
Founder/Senior Advisor
Daniel A. McMillin

STAFF LETTER

TIME FOR CHANGE

We started publishing exactly four years ago, and for those four years, Senior Editor Chris Brown has supervised our monthly menu of major application articles—most of them written by outside authors. It seemed about time for a change. So these days, Chris spends some of his time tracking down noteworthy corporate users of Lotus spreadsheet programs and writing about them himself. His first report, on Conoco Inc., appears on page 44 of this issue.

As is true in many major companies, 1-2-3 is the dominant PC program at Conoco. But the Conoco case is interesting because PC gurus there, in building an executive information system, tried to make 1-2-3 into a presentation-graphics engine. Poor response time ultimately changes too.

The case study is a kind of article that's different from what we've done in the past. It's another one of the changes I told you earlier were in the making here. Sadly, I must report some people changes too.

Like Chris, most of the LOTUS editorial staff who were here at the magazine's startup in 1985 are still here. But that number has begun to dwindle. By the time you read this, two stalwarts of the startup editorial staff will have departed.

These two people had a great deal to do with creating the sound, the look, and the substance of this magazine. If you are a longtime subscriber, you may wish to join me in saluting them for their accomplishments.

Deborah Flynn-Hanrahan, Art Director, did not create the original design for LOTUS. But, as any designer can tell you,

it's what happens after the designer leaves that counts.

Deborah joined LOTUS after a 10-year career as an art director of books and of another magazine. Here, she combined enterprise, talent, attention to detail, and long hours to create, month after month, an interesting and colorful "package" for your mailbox. She brought to the pages of LOTUS many of this country's best illustrators, and her work has been widely recognized by her peers.

Daniel Gasteiger, Macros and Technical Editor, was fresh out of Cornell with a psychology degree—and lots of computer experience—when he joined Lotus Development Corp. in 1983. He was the first staff member hired from outside expressly to help start this magazine.

A "hacker" by inclination, Daniel quickly developed into a premier writer of 1-2-3 macros. But he is also a fine writer and teacher, and he is one of those responsible for the clarity and simplicity that we like to think characterize the text in this magazine. Finally, Daniel has been instrumental in setting the tone of the dialogue with those of you who write with queries and suggestions.

Daniel leaves to pursue a business opportunity too intriguing to turn down. But he's not leaving entirely. As time permits, he will continue to write and "hack" for LOTUS. You can still see his name on the masthead this month—as Contributing Editor. Meanwhile, if you need to reach our new No. 1 resident macro hacker, write to Nick Delonas. He is picking up where Daniel left off.

John B. Campbell
Editorial Director

LOTUS (ISSN 8756-7334) is published monthly by Lotus Publishing Corporation, a subsidiary of the Lotus Development Corporation, One Broadway, Cambridge, MA 02142. Subscription rates, one year, U.S. and U.S. possessions, \$18; Canada, \$22; Foreign, \$30 (airmail). Please allow four to six weeks for receipt of first issue. Executive, Editorial, Circulation, and Advertising Offices: P.O. Box 9123, Cambridge, MA 02139-9123. Telephone: (617) 494-1192. ©Copyright 1989, Lotus Publishing Corporation, all rights reserved. LOTUS is a registered trademark. Officers of Lotus Publishing Corporation: Mark D. Flanagan, President, Robert P. Scheiner, Vice President of Finance and Operations, Chief Financial Officer. Second-class postage paid at Boston, MA, and at additional mailing offices. Postmaster: Please send address changes to LOTUS, Subscription Dept., P.O. Box 95988, Boulder, CO 80322-6588.



For People Who Put A Premium On Performance. And Protection.

The more invaluable your data is to you, the more you'll value Verbatim.® Because when it comes to high performance and data protection, Verbatim has the winning combination no other floppies can copy.

Consider this: Verbatim DataLife® floppies are engineered to perform an average of 50 million revolutions. That's 15 times the industry standard.

Then consider that Verbatim DataLifePlus™ and DataLife HD 5 1/4" disks were the first floppies to be factory formatted.

Verbatim also gives you plenty to consider when it comes to data protection. After all, nearly 50% of all computer users have lost time and money due to accidental data loss. That's why Verbatim offers advantages like DataHold™ and DataHold II

anti-static liners. So static charges are dispersed before they ever have a chance to build up.

For the world's ultimate data protection, DataLifePlus floppies have an exclusive DuPont Teflon® coating. So fingerprints and spills can be easily wiped from the recording surface.

And of course, all Verbatim floppy disks are tested to be 100% error free and are backed by a lifetime warranty.

Verbatim data cassettes and cartridges, 8", 5 1/4" and 3 1/2" diskettes. For people who put a premium on performance and protection.

For more information on the full line of high-quality Verbatim products call 1-800-538-8589.

® Teflon is a DuPont registered trademark.



Verbatim
A Kodak Company

CIRCLE 102 ON READER SERVICE CARD

DOING MORE FOR THE DATA PROCESS™

Finally—A Spreadsheet Compiler That Really Works!

The C-Language Spreadsheet Compiler

Now you can distribute your worksheet or real working demos with the security that your proprietary formulas or macros cannot be changed or copied. The user of your worksheet does not need any spreadsheet program or even have spreadsheet knowledge.



It's simple!

With a single key-stroke **Compile ItoC** converts worksheets into C-language source code and then compiles them into *standalone executable worksheet programs*. **Compile ItoC** features complete compatibility with Lotus 1-2-3 formulas, pointer movement keys, macros (Version 1A and 2.01) and screen displays. So *minimal* or no changes need be made to the original worksheet before compiling.

On-screen Macro Preview and error trapping enables the worksheet Author to check and edit the compiled worksheet to ensure compatibility with the original worksheet. Plus, the keyboard command menu can be customized and restricted to the user.

Find out what Authors at many Fortune 500 companies already know—Compile ItoC provides a practical, problem-free way to distribute your worksheets.

CALL 1-800-877-6788
30-day money back guarantee

Compile ItoC

Resource Analysis International

12581 Venice Boulevard, Suite 204
Los Angeles, CA 90066

SEE OUR PRODUCT REVIEW IN THE
APRIL ISSUE OF LOTUS!

CIRCLE 103 ON READER SERVICE CARD

LETTERS

USER FEEDBACK FOR LOTUS DEVELOPMENT CORP.

I read "Save the Display" [February], which prompted me to dump my long-overdue thoughts about how to get around the 1-2-3 spreadsheet. If my desired commands were incorporated into 1-2-3, your article would be little more than a paragraph.

Often, I want to go just to the edge of the screen. 1-2-3 does not provide a simple function to do that. I propose using the Alt key plus an Arrow key to move to the perimeter. If the pointer is on the perimeter, then a normal screen jump could be performed. The macro names could be {AUP}, {ADOWN}, {ALEFT}, and {ARIGHT}.

Why hasn't Lotus simplified its most-used macro commands with abbreviations? {RIGHT} could be replaced by {RT}, {LEFT} by {LT}, and {DOWN} by {DN}. {UP} is fine! Less-used functions should remain long to reduce human memory clutter.

David A. Hutzler
Baltimore, Md

Editor's note: We've passed your comments on to Lotus Development Corp. In 1-2-3 Release 2/2.01 you can, in fact, abbreviate the macro commands {UP}, {DOWN}, {RIGHT}, and {LEFT} as {U}, {D}, {R}, and {L}.

GOTO MAY DO THE TRICK

In "Set Titles in 1-2-3" [January, Macro Basics], Paula Dempsey advocates that you create macros to clear and reset worksheet titles when you wish to access cells in the titles area.

There is a much easier way to access or alter these cells without disturbing the setting of your worksheet titles. Just press the GOTO key and enter the desired cell location.

After making the change in that cell or elsewhere in the titles area, you can then return to any part of the worksheet by again pressing the GOTO key or by moving the cell pointer. Why bother with a macro when a function key will get you

where you want to go, without any upset to the titles setting?

Donald B. Scrivens
Rochester, NY

Editor's note: Using the GOTO key is a valid option. When you press the GOTO key to enter the titles area of the worksheet, the title rows are repeated on the display. This can be confusing, and the moment you move the pointer below the titles rows, you're once again locked out of the titles area.

THE LION'S SHARE OF THE TAPE-DRIVE MARKET

Stan Miaszkowski did a fine job on a complex subject in "Have You Backed Up Your Hard Disk Today?" [January, Ideas & Trends], in which he discussed the importance of hard-disk backup and the alternatives available today in this product category. He erred, however, in stating that the QIC-40 (quarter-inch tape) standard prevails.

All knowledgeable market researchers agree that the Irwin proprietary format dominates the minicartridge (10-megabyte to 80-megabyte) category. In its authoritative annual Computer Tape Outlook, Freeman Associates assigned a 44% market share of the greater-than-30-megabyte market to Irwin Magnetic Systems in 1987 and only a 24% share to QIC-40 drives—that being the sum of three manufacturers' shares.

Your readers should also be aware that the DC 2000 minicartridge works with all minicartridge drives—in both 3½-inch and 5¼-inch form factors. The article implied that the DC 2000 minicartridge works only with 3½-inch form-factor drives.

Douglas J. White
Vice President, Communications
Irwin Magnetic Systems
Ann Arbor, Mich

Editor's note: The market research firm International Data Corp., in Framingham, Mass., confirms that Irwin Magnetic Systems does have the largest market share—about 45%—for tape drives that use the DC 2000 minicartridge.

WE'RE HAVING FUN NOW

I am a new user of 1-2-3 and a newer subscriber to LOTUS. In two issues I've found more clear and useful information than in any other magazine I subscribe to or have seen on a newsstand. I am extolling its praises to all who will listen. Keep up the good work.

However, I would like to see a couple of pages that are just for fun, like the macro that makes the screen automatically display a series of graphs, described in "Not Your Basic Model" [December]. I don't play games on my computers, but I think you can learn by diddling around.

Howard Y. McFee
Detroit, Mich

Editor's note: *We're always looking for useful applications, and we don't object if they turn out to be fun too.*

MORE ON TRIANGLES

Editor's note: *Thomas W. von Alten wrote the following improvement on the triangle solver we published last year in June ("Sine Here, Please") and which we commented on in Letters in January and April.*

Here is a formula for the troublesome cell E24:

$\text{=ACOS}((C23^2 + C24^2 - C23^2)/$
 $(2 * C23 * C24)) / \text{convert}$

This is shorter than Ken Saul's replacement formula published in April. Furthermore, this formula can be used for all three angles of a triangle. For example, the formula in cell E23 is:

$\text{=ACOS}((C23^2 + C24^2 - C22^2)/$
 $(2 * C23 * C24)) / \text{convert}$

@ERR

"A Pauper's Notepad" (March): Notes can be up to 80 characters long, not 240 as stated in the article. Thanks to Craig Thurber, from Deerfield, Ill., for alerting us to the error.

Letters to the editor should be sent to Letters Editor, LOTUS Magazine, P.O. Box 9123, Cambridge, MA 02139-9123. Letters may be edited for length and clarity.

Run Lotus 1-2-3 with one hand tied behind your back.

Touch one button on the ProHance™ PowerMouse™ and you can copy a range. Touch others and you can move a column, sum a range, open a window, change a number, even create or change a formula.

There's never been a Lotus enhancement tool like PowerMouse. Because PowerMouse gives you the mobility and ease of a mouse, with the power and instant response of a keypad. So you can zoom around your spreadsheet, editing, programming, formatting, and issuing commands in just a fraction of the time.

Easy to learn and easy to use.

In one simple click-drag-release motion, you'll issue commands and identify ranges. And because each key is clearly labeled, you'll be executing familiar Lotus commands in minutes. Without worrying about tedious keystrokes or calling up and walking through menu lines.

PowerMouse handles all that at the touch of a button. All you have to do is plug it into an RS-232 serial port on your IBM PC, XT, AT, PS/2 or 100% compatible. Take a few minutes to install its TSR software. And go to work.

PowerMouse doesn't change the operation, look or feel of Lotus. It just speeds you up. And makes your job more enjoyable.

PowerMouse works with other software too.

PowerMouse works with non-Lotus spreadsheets as well as your other applications—word processing, DBMS, desktop publishing, and

more. Plus, your job is made even easier because PowerMouse is user-programmable. You can personalize it's keys to perform any function that you want it to.

The affordable Lotus speed-up.

With PowerMouse, entering data and commands is more natural and convenient. There's less hassle and no confusion. And no need for additional memory, MIPs, or anything that says "new computer" to purchasing people.

See for yourself. Order PowerMouse for just \$195.00 (plus 7% tax in California). Call toll-free: 1-800-345-9111, Ext. 18. We'll even pay for two-day U.S. shipping.

Unconditional 100% Money-Back Guarantee.

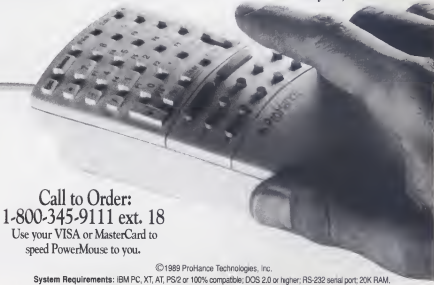
Use PowerMouse for a full 30 days. If you're not completely satisfied, return PowerMouse to us in its original packaging for a full, no-questions-asked refund. We're sure PowerMouse is that good. You will be, too.

Order PowerMouse today.

Then run Lotus 1-2-3 with one hand tied behind your back.

 **ProHance**

ProHance Technologies, Inc.
1307 S. Mary Ave., #104
Sunnyvale, CA 94087



Call to Order:
1-800-345-9111 ext. 18

Use your VISA or MasterCard to
speed PowerMouse to you.

©1989 ProHance Technologies, Inc.

System Requirements: IBM PC, XT, AT, PS/2 or 100% compatible; DOS 2.0 or higher; RS-232 serial port; 20K RAM. PowerMouse and ProHance are trademarks of ProHance Technologies, Inc. Lotus 1-2-3 is a registered trademark of Lotus Development Corp.

Look better with an HP L



Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Allways is a trademark of Funk Software, Inc.

LaserJet now. And Allways.



Get Allways™ from Funk Software FREE when you buy a Hewlett-Packard LaserJet Series II or LaserJet IID printer by August 31, 1989. Then, transform your 1-2-3® output from dull to dramatic — quickly and easily.

You'll never find a better time to add Allways to your Lotus® 1-2-3 program and make your documents look more persuasive and professional. Especially when you team Allways with the advanced capabilities of HP LaserJet printers.

Suddenly spreadsheets take on new credibility as you add lines, boxes, multiple gray shades, and many faces and sizes of type. All with LaserJet printer speed, silence and quality.

Allways harnesses LaserJet printers in ways 1-2-3 alone can't touch. Use Allways fonts and HP font cartridges without escape sequences. With a few keystrokes, select portrait or landscape printing, or access either of the LaserJet IID printer's trays.

Buy your HP LaserJet printer now. And get Allways — FREE. For the address of your nearest HP dealer, call: 1-800-752-0900.

*Hewlett-Packard LaserJet Printers —
Allways from Funk Software*



Free Allways software offer.

I have attached my dated receipt for an HP LaserJet Series II or LaserJet IID printer, purchased from an authorized HP dealer between May 1, 1989 and August 31, 1989. Please send my free Allways software to:

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

You must include an original version of this coupon with a dated copy of your receipt. Printer purchased must be new. Please allow 4-6 weeks for delivery of Allways. Mail offer to:

HP/Allways Free Offer
12011 N.E. First Street, Suite 305
Bellevue, WA 98005

© Hewlett-Packard 1989

LOTUS EXPANDS ON 1-2-3 RELEASES 2.2 AND 3

In a series of recent announcements, Lotus Development Corp. filled in some of the informational gaps on 1-2-3 Releases 2.2 and 3. The main features of both releases were outlined in last month's @Lotus section, but here are more details.

Protected-mode technology 1-2-3 Release 3's protected-mode technology, also known as DOS extension technology, enables users of 80286 and 80386 computers to take full advantage of the 1 megabyte of memory available on these machines and allows them to access up to 16 megabytes of memory.

Lotus worked with Rational Systems, of Natick, Mass., to integrate and adapt the protected-mode technology to 1-2-3 Release 3. Release 3's protected mode supports versions 3.2 and 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification (LIM-EMS).

Allways add-in program Lotus has acquired the rights to *Allways* from Funk Software, of Cambridge, Mass. The add-in program lets 1-2-3 users prepare typeset-quality output with mixed text and graphics from within their spreadsheets. Under the terms of the agreement, Lotus will incorporate *Allways* into its spreadsheet products, beginning with 1-2-3 Release 2.2.

Lotus will license Funk Software to continue to sell *Allways* as an add-in to 1-2-3 Release 2.01 and *Symphony*. In addition, the joint Funk Software/Lotus promotion, in which participating resellers provide the product free with the purchase of 1-2-3 Release 2.01, will continue through the second quarter.

Network support Both new versions of 1-2-3 will have built-in local area network support. 1-2-3 Releases 2.2 and 3 will support leading DOS-compatible

networks. Release 3 will also support OS/2-compatible networks.

Each PC version of 1-2-3 will be available in three editions: The Standard Edition has built-in local area network support and includes one software license, one set of disks, and documentation. The Server Edition, for installation on a network server, contains the complete Standard Edition, plus special network documentation and network-administration software. The Node Edition provides an additional license for the network and includes documentation only.

Availability and pricing 1-2-3 Release 3 is scheduled to ship in June. 1-2-3 Release 2.2 is currently in beta testing and will ship in the third quarter.

Suggested retail prices for 1-2-3 Release 3 are as follows: The Standard Edition will cost \$595, but to honor previous commitments, Lotus will make the product available at \$495 through the end of 1989. The Server Edition will cost \$695; the Node Edition, \$395.

For 1-2-3 Release 2.2, suggested retail prices are: Standard Edition, \$495; Server Edition, \$595; Node Edition, \$295.

System requirements 1-2-3 Release 3 requires an IBM PC AT, PS/2, Compaq, or compatible computer with an 80286 or 80386 processor, a hard disk, and 1 megabyte of RAM. With this configuration, you can expect worksheet space of approximately 400K to 450K, depending on the number of device drivers installed. Under OS/2 Extended Edition 1.1, Lotus recommends 3 megabytes of memory.

1-2-3 Release 2.2 requires an IBM PC, Compaq, or compatible computer with 384K of RAM and two disk drives. Lotus recommends 512K and a hard disk, which will enable you to attach the *Allways* add-in. Release 2.2 supports LIM-

EMS Version 3.2. You can expect approximately the same worksheet space as is available in 1-2-3 Release 2.01.

Upgrade information All current users of 1-2-3 are eligible to upgrade to either Release 2.2 or Release 3 when they become available. Registered 1-2-3 users can purchase upgrades through participating Lotus-authorized resellers or directly from Lotus.

Lotus will mail upgrade information to all registered users. To receive an upgrade, you may use the envelope provided to return your 1-2-3 System Disk or Backup System Disk and payment (check, money order, American Express, MasterCard, or Visa) to Lotus. As an alternative, you may purchase from any Lotus-authorized reseller a Prepaid Upgrade Mailer, which has a suggested retail price of \$150 and contains a return envelope and ordering instructions.

Registered users who have bought 1-2-3 Release 2.01 between September 6, 1988, and the time Release 2.2 ships are eligible to receive a free upgrade to either new version of 1-2-3. The free upgrade is available only through Lotus Development Corp., and you must have a dated proof of purchase.

Registered users who bought any version of 1-2-3 before September 6, 1988, may upgrade to Release 2.2 or Release 3 for a suggested retail price of \$150. However, users who purchased *Allways* for 1-2-3 Release 2.01 from Funk Software are entitled to upgrade to 1-2-3 Release 2.2 for \$90.

Corporate customers may arrange volume upgrades through participating Lotus-authorized resellers or directly from Lotus Development Corp. Contact your Lotus-authorized reseller or Lotus representative for more details.

All prices and terms are for the United States only.

Win two ringside tickets to the Leonard/Hearns fight or a TKO Compaq DESKPRO 386/25 PC system! Instantly!

Just go to your participating Ashton-Tate® dealer to enter the dBASE IV™ TKO Sweepstakes. View the dBASE IV TKO Sweepstakes Demo Disk to see if you're an instant TKO Grand Prize winner. At the end of the demo, you'll also get an entry form that you can mail in for a second shot at the TKO Grand Prize or other fabulous prizes.

5 Grand Prizes: An exclusive VIP weekend package trip for two to Las Vegas, including ringside seats to the Leonard/Hearns fight on June 12, 1989 or a TKO Compaq DESKPRO 386/25 PC system with 4 megabytes of internal memory, 60 megabyte hard disk, VGA graphics board and monitor,

and a 2400-baud modem.

There are lots of other exciting prizes.
50 First prizes: Compaq SLT Portable Laptop PCs (Model 20), dBase IV TKO jackets.

100 Second prizes: Hard-to-get, easy-to-wear Ashton-Tate dBase IV TKO jackets.

500 Third prizes: Free pay-per-view certificates to watch the Leonard/Hearns fight on cable TV.

Early Bird prize: Two trips for two to either Sugar Ray Leonard's or Tommy Hearns' training camp prior to the fight.

Winner by Technical Knockout.

"It has the most impressive list of features in the database environment."
—DataBased Advisor

"dBASE IV has emerged hardy, healthy and equal to the task of proving itself to the skeptical."
—The New York Times

"If you program in dBASE III PLUS, an upgrade to dBASE IV is irresistible."
—InfoWorld

"dBASE IV offers the most powerful tools for both non-programmers and programmers, and is much easier to use than its competitors... It achieved the only four star rating!"
—Software Digest

"It will dominate the MS-DOS and OS/2 database market during the next two years."
—Computer Currents

"Ashton-Tate has done a terrific job with dBASE IV."
—DBMS

"It represents a quantum leap over dBASE III PLUS in functionality, power, and ease of use."
—BYTE Magazine

Since its introduction last October, dBASE IV™ has sold over 300,000 copies. In fact, it's one of the fastest-selling new software products in history.

Even faster than Lotus 1-2-3.

And the applause is growing.

From InfoWorld's readers, who named dBASE IV the MS-DOS Database Product of the Year.

From new users, who are finding that dBASE IV's intuitive New Control Center offers a fast and easy way to utilize all its power.

From seasoned users of dBASE III PLUS,™ who appreciate the more than 310 new or enhanced commands and functions.



From developers and third-party programmers, who are finding in dBASE IV's Developer's Edition all they need to go from inspiration to application.

And from industry heavyweights, who are hailing dBASE IV as the new world champion in database management.

See what all the cheering is about.

Give us a ring at 800-437-4329 ext. 291. We'll give you more information, including details about upgrading from dBASE III PLUS.

Or simply stop by your nearest Ashton-Tate dealer and see dBASE IV up close. It'll knock you out.

CIRCLE 115 ON READER SERVICE CARD

© 1989 Ashton-Tate Corporation. Trademark/Owner: dBASE III PLUS, dBASE IV, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corporation. Other product names used herein are for identification purposes only and may be trademarks of their respective companies. Sweepstakes offer valid where prohibited. Instant win demo disks available while supplies last. No obligation, no purchase necessary in the event of a demo disk instant winner, the original TKO Demo Disk must be mailed to C&B Impact with the completed Instant Win Entry Form to claim the prize. Offer ends 5/31/89. Open to residents of U.S. and Canada (except province of Quebec), age 18 or over. See official rules at your Ashton-Tate dealer for details.

ASHTON-TATE®

THE SPREADSHEET MARKETING WAR

Lotus and Microsoft, like Coke and Pepsi, battle for market share

Lotus Development Corp. reached for one of Madison Avenue's more venerable clichés last December in a full-page *Fortune* magazine ad touting its not-yet-shipped 1-2-3 Release 3 spreadsheet. "Buy 1. Get 1 Free," the ad exhorted in an offer that promised a free upgrade with any purchase of Release 2.01.

Likewise, when archival Microsoft Corp. took out a two-page, full-color ad in *PC Week* in January to sing the praises of *Excel* for the IBM, the ghost of an equally famous slogan lurked behind the words. "Using is believing," the ad said, but for many industry watchers, the message called to mind the old Alka-Seltzer catchphrase, "Try it, you'll like it."

Simplistic slogans, a staple of consumer advertising, seem more and more prevalent in software marketing. But most analysts read the Lotus and Microsoft ads for what they were: the carefully orchestrated tactical maneuvers of two industry giants preparing for a climactic showdown.

That showdown began in earnest in March when Lotus began shipping beta copies of its long-awaited 1-2-3 Release 3 spreadsheet. The new product boasts, among other features, the capabilities for 3-D manipulation, improved multifile linking, and downloading to external databases. It will be followed by what Lotus executives call a family of related products and bundled add-ons.

That family will eventually include a graphical version of 1-2-3 designed to run in IBM's OS/2 Presentation Manager environment, as well as versions of 1-2-3 for Unix systems, minicomputers, mainframes, and even Macs. And Release 2.2, a souped-up version of 2.01 that is scheduled to ship by September, is aimed at the installed base of older 8088 machines. The idea, says Lotus, is to offer its customers the convenience of upward or downward compatibility across a broad spectrum of hardware configurations.

Lotus must shore up its market

The rollout of 1-2-3 Release 3 will be accompanied by fevered speculation about the progress of graphical-based 1-2-3/G. Although Lotus officials are being typically tight-lipped about its release date, 1-2-3/G is likely to prove, in the long run, a more worthy competitor to Microsoft's *Excel*. Technology analyst Charlotte Walker, vice president of County NatWest Securities USA, says that 1-2-3/G "will be the product that we'll want to compare to *Excel*."

For Lotus, the stakes are high. The company hasn't offered a major 1-2-3 upgrade since late 1986. It desperately needs an array of new products to regain the technological momentum lost to *Excel* and, to a lesser degree, Borland International's *Quattro* and Computer Associates International's *SuperCalc*.

Lotus also must act to stem further erosion of its market share. Until recently, most studies put 1-2-3's share of the MS-DOS spreadsheet revenues at an overwhelming 70%, versus 10% to 15% for

This is about Lotus 1-2-3.

As the most powerful spreadsheet, Lotus 1-2-3 gives you the ability to create spreadsheets that are as complex as your business needs. You can create spreadsheets that are as simple as a list of numbers. You can create spreadsheets that are as complex as a financial model. You can create spreadsheets that are as simple as a list of numbers. You can create spreadsheets that are as complex as a financial model. You can create spreadsheets that are as simple as a list of numbers. You can create spreadsheets that are as complex as a financial model.

Microsoft
MAKING IT EASIER

Here's an offer only the most analytical minds in America can appreciate.



Buy 1.

Get 1 free.

Lotus 1-2-3

Excel. But many analysts think that the Lotus share may have slipped by as many as 10 percentage points during the past 12 months. Lotus denies any slippage.

Not even Lotus denies, however, that it has been hurt by two delays in the Release 3 shipment schedule. More than a year has passed since the first promised delivery date, and the tough question for Lotus has been: How do you keep customers from defecting to an attractive, competitive product?

For quite a while, Lotus's answer was to lobby its network of corporate users and retailers in an effort to freeze their purchasing decisions. Last fall, Lotus came up with another answer: an expensive marketing campaign built around a free Release 3 upgrade offer, a software-bundling program featuring Funk Software's *Allways* graphics-presentation package, and plenty of pleas for patience.

Chris Randles, marketing director for *1-2-3*, describes the upgrade and bundling offer as a way of "adding value" to the existing product. Until Release 3 actually starts shipping, he says, "that's the best thing we can do for our users."

Costly but effective

Michael Massaro, senior vice president at Chiat/Day, San Francisco, the ad agency that gained fame for the "1984" ad created for Apple Computer, calls the Lotus campaign "a tried-and-true strategy." Last February, he notes, Ashton-Tate, way behind on its release of *dBase IV*, promised new buyers of *dBase III Plus* that they would be able to upgrade for just \$30. Massaro says, "Companies have been doing it in the mainframe environment for years."

Estimates of the cost of Lotus's promotional gambit vary widely. County NatWest's Walker says Lotus will probably lose \$60 to \$70 for every free upgrade claimed by current purchasers of Release 2.01. Walker's worst-case scenario: Assuming 1-2-3 shipments of about 110,000 copies a month, between last September and this June, Lotus could lose \$75 million in gross revenue. "That's a lot of dough," Walker says.

But such a scenario assumes that everyone who purchased Release 2.01 during the 10-month free-upgrade promotion will eventually cash it in for Release 3. A number of experts dispute this view. They point out that Release 3 requires substantially more memory than Release 2.01 and will run only on 80286- and

80386-based machines. In addition, add-in programs for Release 2.01 will not work with Release 3. "My suspicion is that more than half of the people who bought Release 2.01 with the right to trade up to Release 3 will not exercise that right," declares Jeffrey Tarter, editor of *Softletter*, a software-industry newsletter based in Cambridge, Mass.

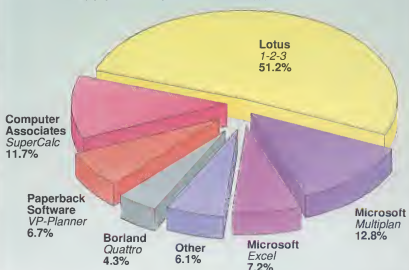
Lotus's Randles readily admits that heavy promotional and R&D expenditures took their toll on the bottom line

stein agency came up with the slogan for an early series of ads touting *Excel* as the "Soul of the New Machines"—a reference to the '286- and '386-based hardware platforms on which the spreadsheet was designed to run.

A so-so reception

Initially, buyers reacted with a yawn. So in May 1988—one month before Lotus's first official announcement of a delay in Release 3 shipment—Microsoft tried to

THE MS-DOS SPREADSHEET MARKET



for the 1988 fourth quarter. Net income for the period skidded 61% on a revenue drop of 2.8%. Of the promotional and R&D spending during that period, Randles comments dryly: "You can deduce that the money comes from somewhere on our balance sheet."

The Excel campaign

Perhaps sensing a vulnerability, Microsoft has steadily increased its pressure on Lotus. The Redmond, Wash., software company is spending millions of dollars on an ad campaign designed to convey the message that graphical-based *Excel*, already available, is the new standard for the emerging hardware platforms of the 1990s. Group Product Manager Philip Welt says that Microsoft budgeted more than \$5 million for its 1989 marketing campaign and many dollars more for seminars, a beefed-up sales and support staff, and related expenses.

Microsoft's campaign began in January 1988, a few months after the fall 1987 rollout of *Excel*. The Key/Donna/Pearl-

break through customer inertia by unveiling an unconditional money-back guarantee for *Excel*, good through January 1990. In January, eight months later, Microsoft, now under the guidance of the Ogilvy & Mather ad agency, responded to Lotus's announcement of a second delay by unleashing its double-page "This Is About Lotus 1-2-3" ad campaign. That ad sought to convince spreadsheet buyers that Lotus's character-based Release 3 was already obsolete.

In that campaign Microsoft turned up the heat another degree by offering a free *Excel* sample disk and a toll-free number to expedite shipment. At the same time, Microsoft unfurled an aggressive pricing strategy that included a \$75 manufacturer's rebate. With the cash-back program, some software dealers could offer 1-2-3 users a discount for *Excel* that substantially undercut the \$150 price of a Release 3 upgrade. "I can get *Excel* for a \$184 street price, and then there's the \$75 rebate," says John Maxwell, an analyst with Dillon Read & Co.

New!
100MB hard disk model.



This 386 Hauls.

We realize putting an Intel® 386 microprocessor in a PC isn't a new concept. But to put a 386 microprocessor, running at 16MHz, in a portable PC that weighs in at only 14.6 pounds certainly is.

And you'll find just that in the new Toshiba T5100.

Thanks to the T5100's 29 msec 40MB hard disk and 144MB 3 $\frac{1}{2}$ " PS/2-compatible diskette drive, you can run complex graphics and CAD/CAM programs faster than you can redesign your latest brainstorm.

We even gave it a built-in EGA gas plasma display and an EGA monitor port. An 82-key full-function keyboard. MS-DOS® And a multitude of built-in ports.

If your good ideas need extra room to become great ones, the T5100 can

be quite accommodating, with its 2MB of RAM that's expandable to a hefty 4MB. To get your ideas on the screen right away, the T5100 comes with Microsoft's®

powerful Windows/386, a powerful multi-tasking operating environment at no additional charge.

Of course, if you'd like to see just how fast the T5100 really is, we have a very simple suggestion for you. Just call 1-800-457-7777, ext. ED, and learn more about our special purchase program for higher education. And we also suggest you call soon.

At the rate they're going, they'll be hauled off in no time.



**The T5100 has a built-in EGA system
and a 40MB hard disk.**

The T5100 is backed by the Exceptional Care program (no cost enrollment required). See your dealer for details. MS-DOS is a registered trademark of Microsoft Corp. Intel is a registered trademark of Intel Corp. PS/2 is a registered trademark of International Business Machines Corp.

In Touch with Tomorrow
TOSHIBA

Toshiba America, Inc., Information Systems Division

CIRCLE 108 ON READER SERVICE CARD

push its Version 5 spreadsheet's Release 3-like 3-D capability and its ability to run on 512K machines.

In the long run, all the promotion may not count for much, or so some believe. Richard Melmon, president of the Melmon, Tawa & Partners advertising agency, based in Palo Alto, Calif., says the market will confer industry leadership not upon the company with the slickest ads but upon the company with the best program. In Melmon's view, it is Microsoft, not Lotus, that has the vision that will enable *Excel* eventually to prevail over 1-2-3.

"But then," adds Melmon, "somebody's going to come out with a product that will eclipse the whole thing. What's going on right now will be passé." Melmon should know. He was once the marketing director for the company that created *VisiCalc*.

By the time this issue of *LOTUS* appears, Microsoft will have launched its

"Forks in the Road" campaign. That ad shows a country road splitting into two sharply diverging paths. It is Microsoft's third attempt to stake out the technological high ground for *Excel* prior to the Release 3 debut.

Expect Lotus to respond with a hard-hitting campaign of its own. David Tarrant, a Lotus vice president for the graphics, text, and information-management division, told *Advertising Age* that the company was preparing to spend \$5 million to promote Release 3. "You can count on us to advertise 1-2-3 quite heavily," Tarrant says.

When asked how Microsoft intended to counter Lotus's expected assault, spokeswoman Sarah Charf declined to comment. But she strongly hinted that her company might wait and see what Lotus's product lineup looks like before making its next move. "We'd be foolish," Charf says, "to disclose our plans in advance."

—Harry Goud

"but we were the fastest machine shipping last fall." Stewart claims that in the two years that Dyna has been shipping computers with pushed chips, there has

INTEL HAS PUSHED THE RATED SPEED OF ITS CHIPS STEADILY UPWARD.

never been a problem attributable to the CPU speed.

However, Intel considers this clock-push strategy dangerous. "No name-brand PC manufacturer we know of has even considered shipping a product with pushed CPUs," claims Intel's Schechter. "No Fortune 500 company will buy speeded-up machines." Such models might work under normal circumstances, he says, but when operating in higher temperatures, they may have problems with certain instruction patterns. These models may also have shorter lifetimes.

Intel maintains that users are better off adding coprocessors to support the CPU at its rated speed. Douglas Rick, an Intel senior product marketing engineer, claims that more than 150 spreadsheet, office, computer-aided design (CAD), and other technical applications use the 80387 math coprocessor. Between 15% and 50% of 80386 computers, he says,

THE PC SPEED GAME: SHAVING THE TIME

Faster CPUs aren't the only way to add hustle.

Kimball Ferguson, manager of engineering services at the University of North Carolina at Chapel Hill, needed a fast computer for design and drafting applications. After looking at some superminicomputers from Apollo Computer and Sun Microsystems, his group settled on a 25-MHz Compaq Deskpro 80386.

That's just one more sign that microcomputers are now fast enough to tackle the jobs of their more expensive big brothers. And soon they will be getting even faster.

While 25 MHz may sound pretty zippy to those whose PCs run at the original 4.77-MHz clock speed, PC vendors are working hard to tune performance even higher. Some of the improvement will come from speedier CPUs. About a dozen PC makers, including IBM, Compaq, and Olivetti USA, are reported to be readying products based on Intel's faster 33-MHz chip. But speed can also be improved by using coprocessors and techniques such as disk-caching.

Pushing the limits

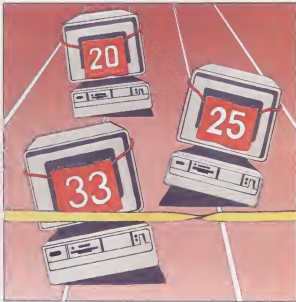
The job of revving CPU speed belongs to Intel Corp. (Santa Clara, Calif.), the sole source of the 80386 chip that powers DOS and OS/2 machines. The original '386s were designed to run at 16 MHz,

but Intel has pushed the rated speed of its CPU chips steadily upward. Intel's fastest chip is the 33-MHz one, which was scheduled to ship in April. "But chip speeds could surpass that," says Bruce Schechter, Intel's product-line manager for midrange microprocessors. "We don't see an end in sight—it's just a question of how we get there."

Most of Intel's chips are already faster than their rated speed.

A chip that fails Intel's 25-MHz test may, in fact, run at 24.99 MHz. Nonetheless, it is sold as a 20-MHz chip. Dyna Computers (San Jose, Calif.), for one, uses this knowledge to build some extra speed into its machines. By connecting a chip rated at 25-MHz to a 30-MHz timing device, Dyna can push the clock speed of its '386 chips about 20% higher than the Intel ratings.

"We're not a household name," admits Chuck Stewart, Dyna's regional sales manager,



SUBSCRIBE NOW!

AND RESERVE THE SPECIAL REPORT ISSUE ON LOTUS® 1-2-3® REL. 3

In this Special Report, *LOTUS* gives you all the information you need to decide whether to upgrade to 1-2-3 Release 2.2 or 3, or remain with your current version.

Look to *LOTUS* for:

-  Clear explanations of the new programs' benefits and features.
-  Detailed analysis of how the new capabilities will affect your applications.
-  A review of upgrade considerations, including hardware requirements and compatibility issues.

To reserve your copy of the Release 3 Special Report issue, act now – quantities are limited.*

DON'T MISS THE EXCITEMENT!

For faster service of your subscription order,
call toll-free

1-800-678-1278

(In Colorado and outside the continental U.S.:
call 1-303-447-9330.)

*To guarantee receipt of the Special Report issue, orders
must be received by June 30, 1989.

Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.



Please send me
12 monthly
issues of *LOTUS*
for just \$18 – a
50% savings off
the annual
newsstand rate
of \$36.

☐ Bill me later ☐ Payment enclosed

Name _____

Company _____

Address _____

City _____

State _____

Zip _____

Please allow 4-6 weeks for delivery of your first issue.
Send foreign orders prepaid in U.S. funds: \$28 Canada,
\$80 (airmail) all others.

45A90

LOTUS



Please send me
12 monthly
issues of *LOTUS*
for just \$18 – a
50% savings off
the annual
newsstand rate
of \$36.

☐ Bill me later ☐ Payment enclosed

Name _____

Company _____

Address _____

City _____

State _____

Zip _____

Please allow 4-6 weeks for delivery of your first issue.
Send foreign orders prepaid in U.S. funds: \$28 Canada,
\$80 (airmail) all others.

45B93

LOTUS



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1264 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

LOTUS

Subscription Department
P.O. Box 52350
Boulder, CO 80321-2350



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1264 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

LOTUS

Subscription Department
P.O. Box 52350
Boulder, CO 80321-2350



LOTUS BACK ISSUES

Request Your FREE INDEX!

LOTUS back issues are the best investment you can make in your reference library! Issues are \$5 each, and quantities are limited. For more information on how to order, and to receive your FREE index of *LOTUS* articles, please write:

LOTUS

Single Copy Sales
P.O. Box 9123
Cambridge, MA 02139-9950

Order soon – quantities are limited!

Foreign orders: \$7/copy Canada,
\$10/copy (airmail) all others.

IDEAS & TRENDS

are now going out with a math coprocessor chip.

In March, Intel announced a new coprocessor based on reduced instruction set computing (RISC) technology. The new i860 chip is particularly well suited for speeding up complex graphics calculations. Several hardware manufacturers, including IBM and AST Research, are investigating this new technology.

Eliminating the bottlenecks

While Intel designs coprocessor chips and faster CPUs, PC firms are concentrating on the rest of the PC architecture. "It doesn't make sense to focus only on the CPU," says David Kirkey, vice president of sales and marketing at Advanced Logic Research (Irvine, Calif.). "You get peak performance," he says, "when CPU and I/O (input/output) speeds match." Without fast memory and fast I/O, he says, a fast clock results in a lot of wait states as the CPU outruns the rest of the system.

Kirkey cites caching as one strategy to boost I/O rate to match the speed of the newer CPU chips. Cache memory is a small, high-speed buffer that stores a copy of the data that was accessed most recently from main memory. Using faster static RAM chips, the cache returns this data to the CPU much faster than your computer could retrieve it from main memory or from a disk.

"You have to look at performance, subsystem by subsystem," agrees Lorie Strong, director of product marketing for Compaq Computer Corp. (Houston, Tex.). "For some applications, Compaq has reached a point of diminishing returns on speeding up the CPU," she says. The company is now looking at other areas, such as the hard-disk subsystem. To speed up the disk, Compaq has added faster controllers, buffering, and software utilities.

Off-loading processing tasks

Graphics is another bottleneck. Fast graphics is important to developers of programs for OS/2's Presentation Manager and other graphical user interfaces. A graphical interface, says Mark Mackaman, Microsoft's OS/2 product manager, requires a more powerful PC than a character-based interface does. "It takes a lot of power to move all those bits around," he says. Partially for that reason, OS/2 has the potential to allow major tasks, such as display, communications, and printing, to be off-loaded to coprocessors in the

PC or in peripheral devices.

However, speeding up the input/output system has its limits, particularly under PC and PC AT architecture. The main connection bus in these architectures can't operate at more than 8 MHz because most peripheral cards can't keep up with faster signals. The bus is also limited in control options, so it's difficult to add much intelligence on other cards without interfering with the operation of the CPU. Furthermore, while the '386 chip can process data in 32-bit chunks, PC and PC AT buses are limited to 8-bit

and 16-bit transfers, respectively.

One answer, the industry agrees, is a faster, wider, more flexible bus, such as IBM's Micro Channel Architecture or the EISA (Extended Industry Standard Architecture) bus proposed by Compaq and several other computer makers. Both architectures will allow full 32-bit transfers, share control among multiple intelligent bus masters, and run several processors at a time.

"The curtain is just starting to rise on the possibilities," says Bruce Stephen, senior PC analyst for International Data

HOW TO SURVIVE THE PAPERWORK JUNGLE

Expedition: For better control of construction contracts

Do you remember what you did on January 21, 1987? Expedition remembers. Expedition software for the IBM PC keeps an accurate record of all the paperwork critical to the contract: correspondence received, transmittals sent, submittals approved or rejected, subcontracts, bids, daily jobsite activity, requests and changes, meeting minutes and more. It lets you sort, select and summarize by date, by vendor, by item or by issue to give you an immediate status report—on screen or on paper.

The myth of the infallible memory

When you can't see the forest for the undergrowth, Expedition helps you follow the trail of a change from request for information through sketches, quotations and approval. Or, you can zero in on a specific issue, like masonry, and review everything connected to it: correspondence, materials received, requests for information, samples, meeting minutes and more.

The valley of the overlooked submittals

In the jungle of paper, it's easy to let a submittal slip by without

proper action.

With Expedition, you can track each one through any number of submission cycles—and generate on-screen or printed reports based on approval status, submittal status, drawing number, specification section, vendor, due date, days outstanding and days elapsed.

Be a hero

Every day's an adventure in the paperwork jungle. But now there's a way to stay a step ahead: Expedition. Contact Primavera today for more information and demo details.

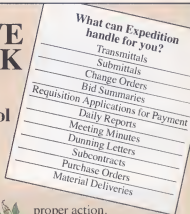
EXPEDITION

Survival Software for the Paperwork Jungle



PRIMAVERA SYSTEMS, INC.

Two Bala Plaza • Bala Cynwyd, PA 19004
800-423-0245 • In PA call 215-667-8600



IDEAS & TRENDS

Corp., a market research firm in Framingham, Mass. However, he cautions, it may take some time before those additional processors are delivered and applications are rewritten to use them.

100 times the speed

The potential of parallel processing can be seen in coprocessor boards from such manufacturers as Definicon Systems (Newbury Park, Calif.). Definicon makes boards based on Motorola 68020 and 68030 chips and on the SPARC RISC processor, whose architecture was designed by Sun Microsystems. Some of the boards can speed up a PC as much as 100 times, says Bradford Nizdil, Definicon's vice president of sales, but their use is generally confined to high-performance scientific and engineering applications, which are often custom-written.

To get that kind of speed increase,

agrees Larry Lesser, president of ParaSoft Corp. (Mission Viejo, Calif.), you need programs that are written for parallel processors. His firm supplies such programs. Custom work is the core of ParaSoft's business, Lesser says, but there's also increasing interest in reworking mainstream applications for parallel processing.

In the meantime, rewriting applications to use '386 hardware features that are unavailable in 8088 and 80286 machines can also provide dramatic speed increases. Borland International, for example, recompiled *Paradox* for the '386's 32-bit operations and added a DOS extender for extra memory. *Paradox/386* runs much faster on a '386 than its predecessor, says Ken Einstein, Borland's director of database strategy. How much faster? Up to 10 times, he says.

—Steve Rosenthal

DOW JONES MAKES A FRIENDLIER DATABASE

But is it too little, too late?

CP HL,SO,DD/DOC=1-10. This command string may look like gibberish. Actually, it is meaningful to a corporate librarian who regularly uses News/Retrieval, the on-line information service network run by Dow Jones & Co.'s Information Services Group.

But the command doesn't mean much to a computer-shy executive. And that's why Dow Jones is pushing DowQuest, a new user-friendly way of digging information out of the company's on-line databases. The information giant wants to attract new subscribers. And it wants to head off competition from developing technologies—in particular, the distribution of financial databases on compact disks.

INTERVIEW: THERESE MYERS, A CHAMPION OF MULTITASKING

And, despite Unix and OS/2, she plans to stick with 'good old DOS.'



The integrated computer system that Therese Myers's team created for Citicorp managers was fast and efficient, but it couldn't run the off-the-shelf software that managers wanted to use in the late 1970s—programs such as *VisiCalc*, *WordStar*, and *dBase II*.

So when Myers founded Quarterdeck Office Systems in 1981, she made sure the company's first product could run these applications. *Desq* was an ambitious PC-based integration program built around an artificial intelligence language written by cofounder Gary Pope. But *Desq* was big and slow by today's standards, and it was a commercial disaster.

Lessons learned, Quarterdeck developed *Desqview*. Written in assembly language, *Desqview*, like OS/2 and *Microsoft Windows*, makes it possible to run several programs at a time, each in its own window. It can also run multiple copies of the same program, allowing you, for example, to access two or more 1-2-3 spreadsheets. However, unlike OS/2 and *Windows*, *Desqview* runs on any IBM PC-compatible computer, including the older PC XT's running at a snail's pace—4.77 MHz. OS/2 requires at least an 80286-based machine, and *Windows* is too slow to run on 8088 machines.

You can use *Desqview* for context switching or multitasking. Context switching holds a program in memory, where it waits for you to use it. With multitasking, a program performs an operation in the background while another program runs in the foreground. *Desqview* accomplishes this by "time slicing," having the CPU divide its time between applications.

Understandably, Myers has become a champion of multitasking, as well as an advocate of "good old DOS." This interview was conducted in February by Lawrence J. Magid, a syndicated computer columnist for the *Los Angeles Times*.

LOTUS: Why would anyone want to run several programs at once?

Myers: Multitasking and context switching give you immediate access to information in several programs. For me, it's a real convenience to have a database open and to use my word processor at the same time. For example, any time the phone rings, I can add a name to the database. Sometimes I also want to print a document and be hooked up to my electronic mail basket.

LOTUS: How would you compare an integrated program such as *Symphony* or *Framework* with multitasking?

IDEAS & TRENDS

With DowQuest, it has retooled its on-line information services to give the subscriber the option of using English words to conduct a search. Thus, searches are easier to define and, in most cases, less expensive. This is one small step in the direction in which information services should go, says William L. Dunn, executive vice president of Dow Jones & Co.

Customer frustration with the expense and difficulty of culling information from databases isn't news to major providers of on-line services. Most of Dow Jones's competitors have also started to offer friendlier ways to find information in their databases. These include easy-to-follow menus, and software that helps you design data searches off-line. Both methods help reduce on-line costs. Executives at on-line information companies readily acknowledge that unless they make it easier to understand and



Myers: It's like comparing a Swiss army knife to a belt that stores whatever tools you need. With an integrated program, you are stuck with the applications that are part of the package. With multitasking, you choose your favorite program in each category.

LOTUS: *Microsoft Windows*, OS/2's Presentation Manager, and *Desqview* let you split the screen into lots of little windows. Doesn't that drive people crazy?

Myers: At trade shows and in our brochures we show *Desqview* with lots of little windows. But that's not the way I work in the program. Most of the time my applications take up the whole screen. However, sometimes I want to compare information from different programs. In that case, I'm comfortable with the split screen. If you use *Lotus Signal* to receive real-time quotes, *Desqview* lets you create a three-line window at the bottom of the screen to see the stock ticker.

LOTUS: Is *Desqview* encouraging people to hang on to DOS rather than move to one of the newer operating systems with a graphical user interface?

Myers: DOS is slowly evolving. Old habits and popular programs don't die. Besides, there are 18 million PCs with 8088 or 8086 CPUs, which can't use a graphical interface.

LOTUS: Couldn't you be accused of throwing people a life preserver instead of giving them a better boat?

Myers: Yes, that's true. But there are a lot of fine DOS programs out there, and we save people money. Why buy new software and powerful hardware if you don't have to? Corporate America would go bankrupt if it suddenly had to convert to OS/2.

LOTUS: Yes, but don't you give Microsoft Chairman and CEO Bill Gates some credit for wanting a world where each new program's interface is the same? It is a little like driving

any model car—everything is exactly where you'd expect it.

Myers: I give Steve Jobs a lot of credit. Bill Gates was just copying Jobs. What Gates was trying to do with *Windows* was to win and control the PC software market. Jobs made huge breakthroughs. The Apple Lisa and the Mac were a gamble, part of a "bet-the-company" vision.

LOTUS: What about Presentation Manager?

Myers: Good question. I imagine that some software developers will write for Presentation Manager if their programs can achieve the desired speed, performance, and resolution.

LOTUS: Do you subscribe to the theory that OS/2 will be the dominant operating system for office computing?

Myers: I don't know. First, it depends on OS/2's performance. And second, there are some alternatives. Take '386 and '286 DOS extenders, for example. They break DOS's 640K memory barrier and, on '386 machines, they give programs access to protected mode and virtual memory. *Desqview* gives you multitasking. *Interleaf*, *Professional Oracle*, *Paradox*, and *Mathematica* are examples of programs that use DOS extenders.

Also, you can't ignore Unix and *DECwindows* or AT&T's *Open Look*. I was looking at a study from International Data Corp. [a market research firm in Framingham, Mass.] that said there would be over 30 million IBM and compatible PCs by 1990. Of those, 5½ million are '386s, and the rest are a mixture of 8088, 80286, and 80486 PCs. It's not clear how all the hardware out there will run OS/2. So by 1990 the real battle will be fought for only 5½ million machines, for which there are a number of contending operating systems. Some will be DOS, some will be Unix, and no question, some will be OS/2. In the meantime, I'm sticking with good old DOS. ■

IDEAS & TRENDS

use their services, they will never reach an untapped customer base that numbers in the millions.

A decade ago, the proponents of on-line services believed that by now most businesspeople with a computer and modem would be logging on for stock

quotes, copies of newspaper articles, or corporate reports. But the market, which consists of potentially as many as 73 million so-called knowledge workers, was never fully tapped. News/Retrieval has fewer than 300,000 subscribers. CompuServe, based in Columbus, Ohio, is the

nation's largest provider of on-line information services, with more than 500,000 subscribers.

The main reason for News/Retrieval's low number of subscribers, says Dow Jones's Dunn, was its confusing search system. Customers were frustrated by spending time on-line and coming up empty-handed.

Specialists agree that traditional computer-search techniques, usually based on arcane Boolean logic, have turned users off. Indeed, communications analyst Gary Arlen of Washington, D.C., describes Dow Jones's former system as "user-surfy at its finest."

CONNECTION MACHINES: MOVING DATA BY BRUTE FORCE

In its bid to make its News/Retrieval on-line service more efficient and user-friendly, Dow Jones & Co. is banking on the Connection Machine, a superpowerful parallel-processing computer that looks like Darth Vader squeezed into a Rubik's cube. The five-foot high stark black cube is made up of eight subcubes.

Introduced in 1985 by Thinking Machines Corp. (Cambridge, Mass.), the

difference in performance between a Connection Machine and a large mainframe is like comparing a [Boeing] 747 with a bicycle," says a company executive.

The applications for which the machine was designed include signal processing, numerical-algorithm design, and fluid-dynamics analysis. But it's the Connection Machine's promise in the area of data retrieval that makes it attractive to on-line services.

Executives at Thinking Machines Corp. boast that fewer than five minutes of training is all a novice needs to perform searches. "It's query by example," says sales manager Gary Rancourt. "Show me a piece of text you like, and I'll search the database for others."

Using an algorithm that searches a whole document, the system scans terms in the example and compares

them to terms in other documents in the database. After making comparisons, the processors exchange information and rank the documents according to how closely they match the search sample. You may also select a paragraph and the system will search based on the contents of that paragraph.

The Connection Machine is not intelligent—that is, it retrieves documents without understanding their content. But the computer may some day be programmed to mimic elements of human reasoning. If so, Thinking Machines Corp. will have built, to parrot the company slogan, "a machine that will be proud of us." —C. R.



Connection Machine contains 65,536 processors, each with its own memory, plus a high-speed communications network. By assigning one processor to each element of data, a Connection Machine can compute millions of data points simultaneously. In this way, you can search an entire database in the time that it normally takes to search a single document.

Inside the Connection Machine, a unique communications network moves data among processors at billions of bits per second. The system's designers are proud of the machine's ability to process 2,500 million instructions per second (mips). "Comparing

English-language queries

Attempting to both remedy the problem and attract new users, Dow Jones has invested \$5 million in two Connection Machine computers, made by Thinking Machines Corp. in Cambridge, Mass. They offer computing power that is 1,000 times faster than the old equipment and, with the new software, let a subscriber query News/Retrieval in English sentences. Dunn says the new DowQuest system "gives the appearance of understanding the question and gives you what it thinks you want."

About 150 News/Retrieval customers tested DowQuest in January, and a sample of 10,000 customers received unlimited free service for the month of March. By midyear Dow Jones will have introduced the remainder of its 285,000 customers to DowQuest.

Initially, Dow Jones will charge \$1 per minute for News/Retrieval searches that use DowQuest. Customers usually pay \$2.14 to \$2.80 per minute during prime-time hours. During the next six months, the company will look at several pricing

'THE TYPICAL ON-LINE SERVICE IS IN THE DARK AGES.'

structures before settling on a firm fee for DowQuest. Dow Jones's startup fee of \$29.95 includes three free on-line hours so that customers can become comfortable with the system. After the first year, the annual service fee goes down to \$18.

The Best For Less

\$3.00

Per Disk/10 or more

Easy to use Software for IBM PC's and compatibles

\$3.50

Per Disk/less than 10

ACCOUNTING

- ☐ **Bilpower Plus (2 disks)** — A complete time and billing program for professionals. (hard disk required)
- ☐ **Financial Consultant 3.0** — An excellent accounting program for home or office.
- ☐ **Medlin Accounting** — Complete with Gen. Ledger, Accounts Receivable, Accounts Payable & Payroll.
- ☐ **Small Business Accounting 1.3** — An excellent accounting program designed for small businesses.

BUSINESS/HOME

- ☐ **Biabook** — A handy program that will keep track of your addresses and print out nice address books.
- ☐ **Express Check** — A great program to manage your checking accounts!
- ☐ **Home Budget & Money Manager** — The title says it all! Easy to use.
- ☐ **Home Inventory** — Helps you keep track of everything you own. Great for insurance.
- ☐ **Times 4.2** — Great scheduler program for appointments, deadlines, reminders and timetables. Can handle up to five people at once.

DATABASE/MAILING LIST MANAGEMENT

- ☐ **Catalist 3.2 (2 disks)** — Powerful list manager. Generates mail merge files for 15 different word processors. (Hard disk recommended)
- ☐ **Wampan** — An excellent dBase clone with menus.

EDUCATION

- ☐ **Amey's First Program 1.4** — Six different learning programs for children ages 4-8. (Color graphics required)
- ☐ **Bible-Q 3.3** — Test your bible knowledge with this fun and educational program.
- ☐ **Fun Facts and Buckets** — A fun way to teach children basic math skills!
- ☐ **Play 'n' Learn 2.03** — A collection of six programs for children 18 months to 4 years.
- ☐ **Typing Teacher** — This disk contains 2 programs designed to improve the speed & accuracy of your typing!
- ☐ **World 2.93** — The ultimate globe! Learn about cities, countries and continents with this computer version of the globe. (CGA compatible graphics required)

GAMES

- ☐ **Acadame Games 1*** — Pac-man (3 versions), Hopper, Space Invaders, Junior Joe and others.
- ☐ **Acadame Games 2*** — Q-Bert, Donkey Kong, Mario Bros., Breakout, Beast and others.
- ☐ **Acadame Games 3*** — Striker, Space War and Quants.
- ☐ **ESA Counseling Football 2.1** — The best football simulation anywhere. EGA or VGA Graphics required.
- ☐ **ESA Games** — A collection of the best EGA games including EGArrows, Reflex, Aldo, Flies and others. EGA or VGA Graphics required.
- ☐ **Monopoly*** — A great rendition of the classic game. Great color and sound!
- ☐ **NetHack** — This classic game is "the ultimate adventure" (hard disk required)
- ☐ **Pieball** — A collection of several different pinball games.
- ☐ **Strategy Games*** — Risk, Othello, Chess, Nyet (Tetris clone), and others.
- ☐ **Star Trek Games** — Three great games on one disk! An arcade game, standard Star Trek game, and a trivia game.

*CGA compatible graphics required

GRAPHICS

- ☐ **Flowerdraw (2 disks)** — An excellent drawing program with a multitude of features!
- ☐ **Star Key-Draw 3.32 (3 disks)** — An exceptionally powerful graphics program.
- ☐ **PC-Key-Draw Library** — A large collection of ready made graphics for PC-Key-Draw.

- Free Catalog
- Free Shipping on orders of 5 or more disks
- All Orders Shipped Same Day
- Unconditional Money Back Guarantee

OUR LATEST AND GREATEST! RS DISK PICKS

- ☐ **Banner & Sign Makers** — A collection of programs to make banners or signs for any occasion. Works with any printer.
- ☐ **Computer/DOCS Tutor** — Learn how to use your computer and DOS easily and correctly with this very educational program. A must for anybody trying to learn about computers!
- ☐ **Ed's Chess** — The best chess game anywhere. (It beats Chessmaster 2000 easily!) Also, this game does NOT require graphics!
- ☐ **Formgen 3.2** — A very versatile form generator. Make any kind of form for business or home on any printer! (Better than EZ Forms Executive!)
- ☐ **Graphic-Less Games** — A great collection of games that don't require color or graphics. (They will work on ANY system!)
- ☐ **The Lotus Learning System (2 disks)** — Learn Lotus 1-2-3 easily and quickly. (Lotus 1-2-3 is NOT required)
- ☐ **PC-FileEdit (3 disks)** — The latest version of an excellent dBase compatible database program. Very powerful!
- ☐ **PC-Write 3.01 (3 disks)** — The latest version of one of the best word processors available. Complete printer support and spelling checker included. Very powerful!
- ☐ **The WordPerfect 5.0 Learning System (2 disks)** — Great program to help you learn WordPerfect. Easy to use!
- ☐ **WordPerfect 5.0 Utilities** — A large collection of utilities (including a menu system), and numerous macros for WordPerfect 5.0.

Order Toll Free (800) 876-3475

Name _____
 Business _____
 Address _____
 City/State/Zip _____
 Phone _____
 Disk Size: ☐ 5 1/4" ☐ 3 1/2" (add \$1 per disk)
 No. Disks _____ x \$ _____ = \$ _____
 Shipping: ☐ 1-4 disks (\$2) _____
 ☐ 5 or more disks (FREE) _____
 ☐ UPS 2nd Day Air/Priority Mail (add \$3) _____
 ☐ UPS Next Day Air (add \$13) _____
 ☐ COD (add \$4) _____
 ☐ Foreign (add \$4) _____
 TOTAL ORDER _____
 Method of payment: ☐ Check/Money Order Enclosed ☐ VISA ☐ MasterCard
 Card No. _____
 Exp. Date _____ Signature _____

MISCELLANEOUS

- ☐ **Easy Project 3.0** — A powerful project manager with lots of features.
- ☐ **Family 3.32** — Trace your family tree with this genealogical program.
- ☐ **Kwikstat 1.3 (2 disks)** — A complete, easy to use statistics package.
- ☐ **Phonoman 4.0** — Create and play music on your PC! Lots of fun!

PRINTING

- ☐ **Epson Utilities (2 disks)** — A collection of utilities for Epson and Epson compatible printers.
- ☐ **HP LaserJet Utilities (2 disks)** — A collection of utilities for the HP LaserJet series of printers and compatibles. Get the most out of your LaserJet, LaserJet II or compatible!
- ☐ **Mr. Label 3.0** — A very powerful and versatile labeling program.
- ☐ **On-Side** — Allows you to print anything sideways.

SPREADSHEETS

- ☐ **Instacalc 2.5** — Memory-resident, Lotus-compatible. ("Editor's Choice" — PC Magazine)
- ☐ **PC-Calc+ (3 disks)** — A very powerful spreadsheet.
- ☐ **Obucalc 3.02** — Lotus-compatible multi-dimensional spreadsheet. ("Editor's Choice" — PC Magazine)

UTILITIES

- ☐ **Automen 4.5** — Latest version of the most popular menuing program of all time!
- ☐ **Best DOS Utilities** — Essential utilities for DOS. File finders, listers and numerous other handy utilities that will save you time. Very easy to use!
- ☐ **Help/Pop-Help** — A program that will help you with any DOS command. Very popular and educational.
- ☐ **Hercules Utilities** — A collection of utilities for Hercules graphics cards. Includes SIMCGA.
- ☐ **Newkey 5.0** — The latest version of the best keyboard macro program available. ("Editor's Choice" — PC Magazine)
- ☐ **PC-Diskseek 2.01** — A Sidekick-like program with even more features!
- ☐ **Professional Master Key** — A collection of utilities like Norton's Recover erased files easily!
- ☐ **Vaccines and Virus Killers** — A collection of utilities designed to protect your system from viruses! This disk includes Flu-Shut-It!

WORD PROCESSING

- ☐ **Galaxy 2.42** — A very easy to use word processor that has lots of features including a spelling checker.
- ☐ **PC-Outline 3.34** — An excellent thought outliner! Can also be used as a free-form database. (Resident & Non-Resident versions included)
- ☐ **PC-Stylet 1.2** — Analyze your writing style.

- Software for IBM PC's and compatibles
- All programs are the latest version and come with instructions on the disk
- Free catalog with every order or by request
- Unconditional money back guarantee!

Fax: (503) 773-7690

This is just a sample of the over 250 quality programs in our library. If you don't see what you're looking for, give us a call!

For more information call:
 (503) 776-5777



Reasonable Solutions
 2712 Jacksonville Highway Medford, Oregon 97501

Delivering Excellence in Software, Service & Support



While Dow Jones made a major investment in new hardware, its competitors in on-line services hope to accomplish the same task with less-expensive software upgrades. CompuServe introduced a new version of *CompuServe Navigator*, a

Mead Data Central's vice president for corporate information services.

Can't please everyone

Industry executives are finding, however, that the trend toward friendlier interfaces doesn't please everyone. When Dow Jones surveyed customers about DowQuest, those who were skilled at using News/Retrieval were less satisfied with DowQuest and its ability to pinpoint information than they were with News/Retrieval's older interface. If, for example, you initiate a DowQuest search by typing factual information such as "earthquake in Armenia," notes Ken Bosomworth, president of International Resource Development (IRD), a market research firm in New Canaan, Conn., you'll probably get the data you want. However, you may become frustrated if you pose a question that involves concepts and reasoning. For example, if you type "What are the underlying problems of the automobile industry?" the response—if you get one at all—may be less illuminating than you'd hoped it would be.

Despite improvements, analysts say information services have a long way to go before they can truly reach the masses. "The typical on-line service is in the Dark Ages," says Arnett of Creative Strategies International. And he is most doubtful about English-based data searches. "English is an inefficient language," he says. "When you know what you want and you want to get it quickly, English is not the best way to do it."

Improvements to on-line information services, say providers, are a response to customer demands for ease, efficiency, accuracy, and speed. But industry analysts say that rapid growth of CD-ROM technology could be a factor in the push

CUSTOMERS WERE FRUSTRATED BY SPENDING TIME ON-LINE AND COMING AWAY EMPTY-HANDED.

Macintosh program that lets you set up a search before going on-line. The program is especially valuable for eliminating "all the cryptic [search] commands and taking away that sense of waiting for something to happen," says Nick Arnett, editor of *Multimedia Computing & Presentations*, published by Creative Strategies Research International, a market research firm in Santa Clara, Calif.

Late this summer CompuServe customers will see more improvements, says spokeswoman Kathleen Munger Thomas. "We're working on a new interface that will make the service even easier to use."

Programs similar to *CompuServe Navigator* are available for the IBM PC and compatible computers. Three years ago Dialog Information Services, another leading on-line information provider, introduced *DialogLink*. The software lets you frame a query off-line rather than on-line while charges are adding up. Still other programs save time and money by automatically storing data on a disk so that you can read it off-line, at your leisure.

Preparing searches off-line

Mead Data Central in Dayton, Ohio, with 400,000 subscribers to medical, legal, and general-interest databases, was scheduled, at press time, to release *Nexis News Plus* in April. Like Dialog's program, the software lets you plan a search off-line. In addition, the Mead program tells you ahead of time how much a search will cost and gives you the actual after-session cost. It lets you request as many as 32 searches, which it conducts sequentially, says Richard Anderson Jr.,

ANALYSTS SAY INFORMATION SERVICES HAVE A LONG WAY TO GO BEFORE THEY CAN TRULY REACH THE MASSES.

to keep on-line customers satisfied.

A compact disk can hold more than 200,000 pages of the same business and financial data available from on-line services. If immediacy is not paramount, weekly CD-ROM updates can be far cheaper than getting the same information on-line. Dow Jones's Dunn acknowledges the niche CD-ROM technology has carved into the market. But he dismisses the notion that compact disks will replace on-line services. "There's a place for both," he says.

Still, the new CD-ROM technology is a factor that providers of on-line services really hadn't reckoned with until recently. Says IRD's Bosomworth: "The [on-line services] vendor is going to see his revenues get a haircut."

—Cynthia Roberts

DEVELOPERS PUT APPLICATIONS INTO SILICON Programs execute faster, code more secure.

It sounds like a bad joke: What do you get when you cross a computer program with an integrated circuit? The answer is *firmware*, and a growing number of applications are being carved into silicon.

This summer Lotus Development Corp. will get into the firmware act. Lotus will be coming out with a firmware version of *1-2-3* Release 2.01 for NEC Home Electronics' 44-pound Ultralite laptop computer. The credit card-size ROM card will cost \$495, the same price as Lotus's standard *1-2-3* package. Lotus also plans to put several of its other programs onto ROM cards for the Ultralite, including *Lotus Agenda* and a *Lotus Metro/Lo-*

tus Express combination.

Firmware is not new; you probably have some in your microwave oven, in your car, or in other products that use microprocessors. Until recently, firmware for computers has been limited mainly to applications for laptop computers and portable PCs, but firmware is now becoming an increasingly large component of the PC itself. When PCs were first introduced, the only firmware was the basic input/output system in read-only memory (ROM BIOS). Today, entire chip sets embedded with several thousand lines of assembly language code are required to make a PS/2 clone. And applications developed for specific

IDEAS & TRENDS

tasks are also finding their way onto firmware.

Firmware falls into two broad categories: systems software (which is embedded into ROM) and applications programs. Full-featured, ROM-based applications running under DOS are becoming more common for several reasons.

Fewer demands on the CPU

The most important reasons are that firmware applications usually run faster and make fewer demands on the CPU. Freeing up the CPU will become especially important as people switch to multitasking environments and operating systems such as OS/2 and Unix. While 80286 and 80386 microprocessors have more computing power than the earlier 8086 and 8088 processors, a multitasking operating system uses more CPU time than does a single-tasking system. OS/2 can manage the demands of several applications running at once, but with only one processor, the CPU itself may become a bottleneck.

According to George Eberhardt, president of Computer Innovations (Tinton

Falls, N.J.), firmware programs are often more reliable than software programs. Errors are sometimes introduced into a program stored on disk as the software is read from the disk into the computer's RAM. Error-checking routines keep these errors to an acceptable level for most applications; however, in situations that call for absolute reliability, firmware is usually used to avoid any chance of error. Eberhardt adds that from a developer's standpoint, firmware is "a form of copy protection."

On the downside, one of the disadvantages of firmware is that it is difficult to modify. Marc Sokol, executive vice president of Realita Inc., a COBOL-language development company in Chicago, says that before the program is embedded in ROM, "you really have to be very confident because once the program is in ROM, there is no turning back."

Dave Schmitt, president of Lattice, a C-language development firm in Lombard, Ill., agrees that the hardest task in firmware development is to clean up the code.

In addition to developing a C compiler

with functions designed to assist firmware developers, Schmitt has also placed applications such as *Unicalq* on firmware. "The quality assurance we had to go through was incredible," he says.

Firmware for laptops

Traveling Software (Bothell, Wash.) has developed several ROM-based applications for portable computers, and Gordon Shaw, manager of custom services, says that applications are based on 32K chips.

In addition to putting its own and public domain programs onto firmware, the company creates firmware versions of custom applications. These applications are mainly for Tandy Model 100, 102, and 200 laptop computers and for NEC 8201A and 8300 laptops, but NEC sells its Ultra-lite laptop with Traveling Software's *Lap-Link* file-transfer program on firmware.

As both multitasking operating systems and laptop computers become more popular, look for a greater number of major applications to be incorporated onto firmware. It's a trend that makes sense from both a developer's and a user's standpoint.

—Avery Jenkins

LOTUS BACK ISSUES

At \$5 each, *LOTUS* back issues are the best investment you can make in your reference library!

Order soon — quantities are limited. If you know the issues you need to complete your *LOTUS* library, simply list them below and mail this coupon with your check. To help you identify which issues to order, an index of articles is available FREE.

ISSUE MONTH/YEAR	SHIP TO
_____	NAME _____
_____	COMPANY _____
_____	ADDRESS _____
_____	CITY/STATE/ZIP _____

Total Enclosed _____ ☐ Yes, I would like a FREE index.

Mail your order or index request to: *LOTUS*, Single Copy Sales, P.O. Box 9123, Cambridge, MA 02139-9950.

Please allow 3-4 weeks for your back issues to arrive.
(Canada: \$7/copy. All other foreign: \$10/copy)

Lotus 1-2-3® Gives You 93

@nalyt™

Gives You 135 More!

@ Functions for 1-2-3 Spreadsheets

Five @ function add-in products for the financial professional. Each function carefully designed, optimized, tested and documented.

<i>financial</i> @nalyt	Amortization Generalized cash flow analysis. Dates & business days. Quote conversion.
<i>stats</i> @nalyt	Descriptive statistics. Parametric & nonparametric tests. Probability density & distribution functions.
<i>bond</i> @nalyt	Treasury, agency, corporate & municipal bonds. Bills & CD's. Yields, duration, etc. SIA compatible.
<i>options</i> @nalyt	Modified binomial and Black-Scholes models. Sensitivities. Historical and implied volatilities.
<i>mbs</i> @nalyt	Mortgage-backed securities. CPR, PSA, <i>n</i> month & custom prepayment. Yield, duration, WAL, etc.

212-941-7330



Tech Hackers Inc.
515 Broadway
New York, NY 10012

Lotus 1-2-3 is a registered trademark of Lotus Development Corporation

THE ULTIMATE BUDGET IN 1-2-3

Now you can have as much fun as Richard G. Darman, the Bush Administration's budget chief, without any of the responsibility. The National Chamber Foundation (NCF), the research arm of the U.S. Chamber of Commerce, has developed a five-year 1-2-3 model of the national budget for 1989 to 1993.

Do you think this country spends too much on guns and not enough on butter? Find out for yourself how alternative allocations for national defense, agriculture, energy, space and technology, social services, and other big-ticket items affect the federal deficit. The model starts with economic-growth projections published by the Congressional Budget Office, but you can substitute your own. The

The NCF is primarily interested in getting members of Congress to use the model, but if you want to try your hand at balancing the U.S. budget, send \$20 to the National Chamber Foundation, 1615 H St. NW, Washington, DC 20062. The model comes on a 3½- or 5¼-inch disk and requires 1-2-3 Release 2/2.01 and 640K of RAM.

—Jennifer Smith

CD-ROMs COST MORE THAN ON-LINE SERVICES

It's still cheaper to get scientific and financial information from on-line services than to have it delivered on CD-ROMs. That's the conclusion of a recent study conducted by the Digital Information Group, in Stamford, Conn.

Says DIG's president, Maureen Fleming: "A library would pay millions of dollars in annual subscription fees in order to replace the Dialog on-line service with many individual CD-ROM databases."

Fleming adds, however, that CD-ROMs may be a better bargain for heavy users of a particular database. According to DIG's *Information Industry Factbook 1988*, a yearbook of trends and statistics about the information-publishing business, the average price of a CD-ROM title for professional markets was \$1,829. On-line subscribers seeking the same data paid about \$1,200

on average to each information provider.

But, says DIG's Fleming, five years from now, as CD-ROM prices continue to decline, most on-line subscribers will get the information they need on CD-ROMs.

—Rich Friedman

EXPANDED-MEMORY CHIPS

Many personal-computer users equip their systems with an expanded-memory board so that their DOS programs can access memory above the 640K DOS limit. Even with 8K of memory—that is, with only the electronics and the memory-management software—expanded-memory boards typically cost \$400 to \$1,000 or more. Soon, however, you'll be able to reap the benefits of expanded memory more conveniently and at a much lower cost.

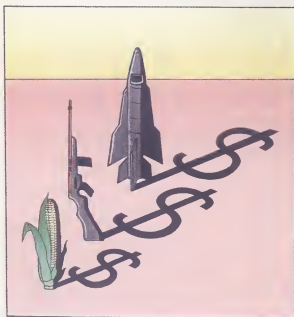
A new chip from Chips and Technologies (San Jose, Calif.) allows PC AT- and PS/2-compatible computers to access expanded memory without the need for an expanded-memory board. The chip, known as the 82C631, resides on the PC's main circuit board. It runs with Chips and Technologies' Expanded Memory Manager program to provide memory-swapping and multitasking functions. The chip supports versions 3.2 and 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification, as well as the Extended Expanded Memory Specification developed by AST Research, Ashton-Tate, and Quadram Corp.

One 82C631 chip might permit two or three simultaneous tasks, but as many as four chips can be stacked to allow for seven or eight tasks.

Controlling expanded-memory functions from the motherboard not only means saving a bus slot, says Charles McGrory, product marketing manager for the new chip, it also means faster performance because the chip has zero wait states. In addition, he says, the chip's \$12.50 volume cost to manufacturers probably means it will cost users about \$50 at the retail level.

Volume shipments of the new chip are scheduled to begin this month. McGrory says to expect announcements this year from U.S. computer manufacturers regarding the shipment of PCs containing the new chip.

—J. S.



NCF model uses the January 1989 CBO projections, but the NCF plans to update the model as often as the CBO revises its projections—at least twice yearly, says Carlos Bonilla, the NCF's manager and director of federal tax research.

BOOK PUBLISHERS ALSO WAIT

When *1-2-3 Release 3* hits the streets sometime next month, computer-book publishers will flood the market with books that cover Lotus Development Corp.'s major *1-2-3* upgrade. Lotus says it's cooperating with more than 30 publishers on a total of more than 100 titles. Que Corp. (Carmel, Ind.), for example, lists six titles related to *1-2-3 Release 3* in its most recent catalog. Brady Books (New York) and Osborne/McGraw-Hill (Berkeley, Calif.) also plan to publish six titles each, and Sybex (Alameda, Calif.) says it has five titles in the works.

While Release 3's delay has been as frustrating for book publishers as it is for the world at large, "in the computer business, everybody rolls with the punches," says Brady Books' publicity manager, Bobbie Feldman. "Of course the delay upset our schedules," says Hannah Robinson, a marketing manager with Sybex, "but we were ready for it."

Unlike literature or textbook publishers, who often have production schedules that stretch eight months or longer, computer-book publishers organize their operations for maximum flexibility. "We've brought books from scratch to finish in 21 days," says Robinson. In fact, several publishers expect to publish *1-2-3 Release 3* books simultaneously with Lotus's release of the program.

Authors are also geared for fast turnarounds. "My chapters will be written probably four weeks after I get the beta copy of Release 3," says Stephen Nelson, coauthor of Que Corp.'s forthcoming *Using 1-2-3 Release 3*.

—J. S.



FIRST CELLULAR COMPUTER

Don't let a traffic jam keep you from delivering your report on time. Just call your office from your car and send the report to your boss as you crawl along the interstate. Intelligence Technology Corp. (Dallas) has introduced the first cellular computer. It may look like an ordinary laptop, but inside the case resides a speaker phone for voice communications, as well as a cellular-compatible modem.

The '286-based 12-MHz laptop comes with a 40-megabyte hard disk, 640K of RAM, EGA-compatible graphics, and a two-hour, rechargeable battery. For \$7,595 you also get communications software, a power adapter that runs the laptop from your car's cig-

rette lighter, a carrying case, and a telephone headset that lets you keep both hands on the wheel while you chat. For traditionalists, there's also a conventional telephone handset that plugs into the computer.

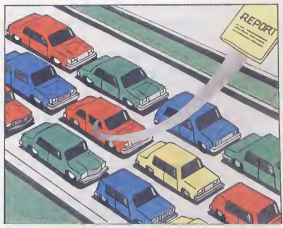
—Jon Pepper

PORTABLE MACINTOSHES

This month, Colby Systems (Fresno, Calif.) will release a new version of its Walkmac Macintosh laptop. The Walkmac/030 is based on Apple's new Macintosh SE/30. Meanwhile, at Apple Computer's annual shareholders meeting in February, CEO John Sculley hinted that Apple will announce its own Mac laptop sometime this summer. The Apple entry is reported to feature a high-resolution black-and-white display and 1 or 2 megabytes of RAM.

Colby Systems' 68030-based Walkmac has a blue-on-white backlit display and a 2.4-megabyte floppy-disk drive. Options include up to 2 megabytes of RAM, a 40-megabyte hard-disk drive, and a 2400-baud modem. Colby Systems' proprietary bus lets you connect different monitors and peripherals to the Walkmac through a single connector. The 12-pound Walkmac will sell for about \$6,500.

—J. S.



START HERE

AN INTRODUCTION TO MENUS

A close look at the Copy command reveals some important information about formulas.

BY DANIEL GASTEIGER

By now you know how to get around in the worksheet and how to make entries into cells. You've written a few simple formulas, and you know how to enter various labels to identify a worksheet's contents. This is all you need to know to create simple spreadsheet models.

However, 1-2-3 provides a slew of tools that let you copy cells, move information, change the widths of columns, change the position of your labels, perform regression analysis, and most important, record a day's work on disk so that you can retrieve it in future work sessions. You gain access to these tools by using command menus.

In this first exploration of the 1-2-3 command menus, you'll learn about copying cells.

A SAMPLE WORKSHEET

First create the following sample worksheet, which may look familiar because we created it in last month's "Start Here" column.

	A	B	C	D	E	F
1	Monthly Revenue by Product					
2						
3		Jan	Feb			
4	Pencils	1268	963	2211		
5	Binders	984	841			
6	Notepads	875	659			
7	Erasers	328	231			
8		-----	-----			
9	Totals	3435	2694			

The worksheet's title, *Monthly Revenue by Product*, is a single long label in cell A1. Enter it and the labels in cells A4, A5, A6, and A7 by moving the cell pointer to each cell in turn, typing the characters shown, and pressing Return. Then enter the values shown in red.

When you enter the word *Totals* in cell A9, begin by typing a quotation mark, and when you enter the labels in cells B3 and C3, begin each label with a caret (^). To create the underlines in cells B8 and C8, enter a backslash and a hyphen (\-) in each cell.

It's clear from the illustration that this worksheet should contain formulas that calculate the total revenue generated in January and February. To create the first of the formulas, move the cell pointer to cell B9. Then type

the formula $+B4+B5+B6+B7$ and press Return. The new formula appears in the control panel next to the current-cell indicator in the upper-left corner of your screen, and cell B9 displays the value 3435.

Typing character by character isn't the only way to create a formula in 1-2-3. You can also indicate which cells to use in a formula simply by moving the cell pointer to the desired cells. Use this approach to enter the formula for cell C9.

Move the pointer to C9 and press the plus key (+). The mode indicator in the upper-right corner of your screen shows that you're entering a value. Press the UpArrow key and the cell pointer moves up. The mode indicator reveals that 1-2-3 is now in Point mode, and the cell address C8 appears next to the plus sign in the control panel.

Press the UpArrow key four more times. With each press of the key, notice that the cell address adjacent to the current-cell indicator changes. When the cell pointer reaches cell C4, press the plus key to indicate that this cell should appear in the formula. The pointer jumps back to cell C9. Press the UpArrow key four times to indicate the second cell that 1-2-3 should use in the formula, and press the plus key. Press UpArrow three times to indicate the third cell reference, then press the plus key and press UpArrow twice.

At this point, the formula adjacent to the current-cell indicator is complete. Enter it into the cell by pressing Return.

COPY TO SAVE KEYSTROKES

You can always enter formulas by typing them character by character or by pointing to each cell you wish to include. Both processes are time-consuming, but by using 1-2-3's Copy command, you can speed up formula entry.

The Copy command lets you copy the contents of a cell to one or more other cells. For example, move the cell pointer to cell D4 and use the pointing method to enter a formula that sums January and February pencil sales: Press the plus key, press LeftArrow twice, press the plus key, press LeftArrow once, and press Return.

To sum January and February sales of binders, notepads, and erasers, you could move the pointer to each

cell of column D in turn and enter another formula, or you could reuse the formula you've already entered.

To reuse a formula, you copy it. 1-2-3 displays the formula you entered as +B4+C4. However, to 1-2-3 the formula actually means, "Add the value of the cell that is two cells to the left to the value of the cell that is one cell to the left." When you copy the formula to another cell, the copy retains its meaning to 1-2-3. In other words, when you copy this formula to cell D5, the copy will read +B5+C5. Like the original formula, it means, "Add the cell that is two cells to the left to the cell that is one cell to the left." To copy a formula, you use the menus.

SELECT COPY FROM THE MENU

Make sure that the cell pointer is in cell D4, then press the slash key, which is the key immediately to the left of the shift key on the right side of your keyboard. 1-2-3's main menu immediately appears in the control panel, as shown in the figure below, and the mode indicator in the upper-right corner displays MENU.

D4: +B4+C4

Worksheet Range Copy Move File Print Graph Data System Quit
Global Insert Delete Column Erase Titles Window Status Page

	A	B	C	D	E	F	G	H
1	Monthly Revenue by Product							
2								
3		Jan	Feb					
4	Pencils	1248	963	2211				
5	Binders	984	841					
6	Notepads	875	659					
7	Erasers	328	231					
8								
9	Totals	3435	2694					

The top line of the menu contains the menu command selections. The first selection, Worksheet, is highlighted by the menu pointer. The text in the second row of the menu, also known as a menu prompt, describes what task would be performed by the highlighted menu item. With Worksheet highlighted, the prompt reveals that when you select Worksheet, a second menu will appear with more selections.

Select Worksheet by pressing Return and you see instantly the second menu that was just described. But because you're not going to make a selection from the Worksheet menu, you need to go back one step to the main menu. To do this, simply press the Escape key (marked Esc on most keyboards). In fact, you can press the Escape key whenever you wish to go back a step in 1-2-3's menus. To verify this, press Escape once more and 1-2-3 returns to Ready mode.

Now we'll copy the cell. Press slash to access the menu, then press RightArrow twice. With the Copy command highlighted, the menu prompt reads *Copy a cell or range of cells*. When you press Return to select Copy, 1-2-3 displays in the control panel the prompt *Enter range to copy FROM: D4.D4*. Because the cell pointer is in cell D4,

1-2-3 guesses that that's the cell you wish to copy. You could enter a new address, but since you want to copy cell D4, simply press Return.

1-2-3 displays the prompt *Enter range to copy TO: D4*. For now, just copy the formula to cell D5. You can either type D5 or press the DownArrow key and point to cell D5. Whichever you decide to do, once the control panel displays the address D5 as the range to copy to, press Return.

Move the cell pointer down to cell D5, and confirm that the cell addresses in the new formula now refer to cells in row 5.

You'd get frustrated pretty quickly if you had to reissue the Copy command for every copy of a formula you wish to create in your worksheet. When we copy the formula a second time, we'll copy it to two cells at once rather than to just a single cell.

With the cell pointer in cell D5, press slash and select Copy from the menu. Press Return to identify cell D5 as the cell to copy from, and then press the DownArrow key and point to cell D6. Now press the period key to "anchor" the cell pointer in cell D6. With the cell pointer anchored, the cell address in the prompt reads D6.D6 rather than just D6. When you press DownArrow, the pointer will stretch, leaving cell D6 highlighted and also highlighting cell D7.

The area that is now highlighted in your worksheet is called a range. Any rectangular collection of cells is a range. You indicate a range to 1-2-3 by identifying its top-left and bottom-right cells. 1-2-3 displays the range coordinates in the control panel as D6.D7.

You can identify a range to 1-2-3 in two ways. You can type in the range coordinates—for example, A1.B7. Or you can highlight the range by pointing to the range's top-left cell, anchoring the pointer by pressing the period key, then extending the pointer to the range's bottom-right cell. In either case, make the identification final by pressing Return. When you press Return now, 1-2-3 copies the formula from cell D5 to each of the cells in range D6.D7.

Move the cell pointer to cell D6, and confirm that the cell addresses in the new formula refer to cells in row 6. Likewise, examine the formula in cell D7, and see that its references are to cells B7 and C7.

Again, to 1-2-3, the formula means, "Add the cell that is two cells to the left to the cell that is one cell to the left." Formulaic references of this type are called relative references because the cells they refer to are related to the formula's location in the worksheet. You can create formulas with absolute references that will refer to a given cell in every copy of the formula you create. We'll explore this topic in a later column. ■

Do they call it a hard drive it's so hard to find what you want



```
PLAN1   DOC      3803   9-18-88   3:36p
PLAN2   DOC      2779  11-19-88   6:01p
PLAN2B  DOC      2880  11-19-88   6:23p
DIUPLAN DOC     56227  11-20-88  10:12a
MYPLAN  DOC     14656  12-04-88   1:30p
BILLING DOC      3766  12-10-88  10:09a
HUPPLAN DOC     27864  12-14-88  12:29p
QTLVSAL DOC      9076  12-10-88   1:41p
QTLVSAL DOC     11367  12-10-88  10:23a
PROJECT1 DOC     12675  1-04-89   9:15a
PROPOSAL DOC      9356  1-06-89   8:33a
CREDIT1 DOC     31089  1-10-89  11:12a
CREDIT2 DOC     30980  1-10-89   2:35p
CREDIT3 DOC      19788  1-12-89   9:45a
B9FORCS1 DOC     22385  1-16-89  12:01a
B9FORCS2 DOC     22499  1-17-89   9:05a
ZNDHALF DOC     12345  1-23-89   3:45p
MKTPLAN1 DOC      1291  1-24-89  10:42a
MKTPLAN2 DOC      1306  1-24-89  11:14a
FACTSHET DOC      5204  1-26-89   9:15a
SCHEDULE DOC      7069  1-30-89  12:33p
69 File(s) 1650688 bytes free
```

C:\MS\MYDOCS\

You're looking for a specific piece of information on your PC. But you can't remember which memo, spreadsheet or even which file it's contained in.

And you're certainly not about to

search through each directory, much less load and unload every file to find it.

That's why we created Magellan®. The first utility that helps you find your files by letting you instantly see their contents as

ard disk because at you're looking for?

they appear in your favorite applications.

Without even having to load the specific applications that created the file.

With Magellan, all you need is a general idea of what you're looking for.

Because unlike other programs, the Magellan Explore function can perform a search on a phrase, a topic, an idea or even an entire file. Not just key words.

Then it lists your "found" files on the left of your screen in order of how relevant the contents are to the search topic.

As fast as you can scroll down this list, the Magellan SpeedView function instantly displays the complete contents of each file on the right of your screen, highlighting the relevant text for you.

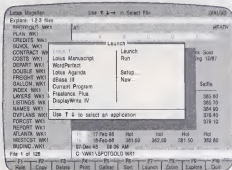
Using the information is easiest of all. Because all it takes is one keystroke to launch into the application that created the file, and it'll be loaded and ready to go.

Or you could use Magellan to gather the

information you choose from several different applications (like a 1-2-3® spreadsheet and a WordPerfect® memo)¹ and put it into a single file so you can start using it right away.

Best of all, you're productive literally

five minutes after installing Magellan. The menus are intuitive, and everything you need to run the program is on the screen right



With one keystroke, Magellan loads the selected file and application, in this case 1-2-3, so you're ready to go to work.

in front of you. Which means that there is virtually no learning curve.

Call Lotus Selects at 1-800-635-6887 to order Magellan or a free demo kit.* Ask for LEM-3600 to order Magellan or LEM-3603 for the kit. Or visit an authorized Lotus dealer today.

That way, you can spend time working with information, instead of just looking for it on your PC.



Introducing Lotus Magellan

International Office and MultiMate are registered trademarks of Ashton-Tate Corporation. WordStar is a registered trademark of Micropro International Corporation. Microsoft and Word are registered trademarks of Microsoft Corporation. ©1987 Lotus Development Corporation. Lotus is a registered trademark of Lotus Development Corporation.

1-2-3 MACROS

MACRO LETTERS

Work with graphs, simplify data entry, store macros in libraries—your letters let us explore these topics, and more.

BY NICHOLAS DELONAS

We try to print a sampling of your letters each month in the Macros section. But there are always letters we wish we didn't have to omit for space considerations. This month we devote the entire column to some of the interesting macro letters we haven't been able to squeeze in until now.

COUNTING WORDS IN 1-2-3

Is there a way to count words in a given range in 1-2-3? I use 1-2-3 to write articles, and a word counter would be very helpful.

*J. Michael Maile
Inter-Commerce Realty
Burlington, Ontario*

The editor replies: Generally, text in 1-2-3 consists of a single column of long labels that have been "word-wrapped" with the Range Justify command. With a little busywork, it's quite simple to count the words.

First save the worksheet because this technique will

alter it. Delete any blank lines between paragraphs. Then set the width of the first column to 1: Move the pointer to the column, select /Worksheet Column Set-Width, and enter 1.

Position the cell pointer on the first cell of text, select /Range Justify, and press Return. 1-2-3 will justify the text so that a single word appears in each cell of the column. If your text starts in the first row of the worksheet, press the End key and the DownArrow key, and the cell pointer will move to the last word in the column. This row number reveals how many words are in the document.

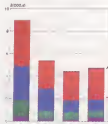
If your text begins in a row other than row 1, enter the formula @COUNT(textrange), where *textrange* is the entire column of words. The formula results in an accurate word count.

Using this approach, you can determine word counts for documents of up to 8,192 words (2,048 words in 1-2-3 Release 1A). A document of that size might run as many as 50 double-spaced manuscript pages.

Remember not to save the altered file.



WORLDWIDE SALES



Impress the critics with your next film.



3M film looks best on 3M overhead projectors.

To make a strong impression, you need to combine the right information with the right presentation tools. That includes the best overhead transparency film you can buy — 3M computer-generated transparency film.

At first glance, most transparency film appears the same. But when projected onto a large screen, 3M film really stands out. Colors are vibrant and true. Characters are sharp and defined. So your polished presentation doesn't lose its shine.

Whatever type of plotter or printer you use, rely on 3M film for feeding reliability and a clearer image. 3M transparency films, projectors and accessories are available

at your local 3M AV dealer or stationery store. Or call us at 1-800-328-1371. In MN 612-736-1285. In Canada 1-800-268-9696.

FREE Graphics Software



Return this coupon for our Trumpet™ introductory software package. This IBM compatible package lets you design basic graphics for overhead presentations. Indicate disk size: ☐ 3 1/2" ☐ 5 1/4". Offer good in U.S. only.

Name

Company

Address

City State Zip

Telephone ()

Free sample requests must be made with this coupon. No phone calls, please. Mail to 3M Audio Visual Division, Building 225-3NE-01, 3M Center, St. Paul, MN 55144-1000, LT589

The tools to take charge.

3M

OCTAL TO DECIMAL CONVERSION

I need help. Is there a way to convert an octal number (base 8) to a decimal number (base 10)?

Chuck Horner
Phoenix, Ariz.

The editor replies: The macro in the following figure uses a {FOR} loop to determine an octal integer's decimal equivalent:

	A	B	C	D	E	F
1	cntr					
2	digits		ERR			
3	x		ERR			
4						
5	octal					
6	decimal					
7						
8	\o	(GETLABEL "Enter Octal Number: ",octal)				
9		(LET octal,@STRING(@VALUE(octal),0))				
10		(IF @ISERR(octal)){BRANCH fail}				
11		(IF #NOT#@ISERR(@FIND("8",octal,0))){BRANCH fail}				
12		(IF #NOT#@ISERR(@FIND("9",octal,0))){BRANCH fail}				
13		(LET decimal,0){CALC}				
14		(FOR cntr,1,digits,1,run)				
15		(IF @CODE(octal)=45){LET decimal,-decimal}				
16		(GOTO)decimal"				
17						
18	run	(RECALC x){LET decimal,decimal+(x*(8^(cntr-1)))}				
19						
20	fail	(LET decimal,@ERR){GOTO)decimal"				

To create the macro, enter the labels as shown, omitting for the moment the cells printed in red. Assign the labels in column A as names for the adjacent cells of column B: Select /Range Name Labels Right and indicate range A1..A20. Enter the following formulas:

Cell Formula

B2: @LENGTH(octal) - (@CODE(octal)=45)

B3: @VALUE(@LEFT(@RIGHT(octal,cntr),1))

The formula in *digits* yields the length of the numeric portion of the string stored in *octal*. The formula in *x* yields a character from the label in *octal* that is as many characters to the left of the last character in that label as the value in *cntr* - 1.

The macro is ready to run. To use it, simply hold down the MACRO key (Alt on most computers) and press O. Enter an octal number in response to the macro's prompt, then wait a moment. The number's decimal equivalent will appear in the cell named *decimal*, cell B6. Here's how the macro works:

{GETLABEL "Enter Octal Number: ",octal} prompts you for the octal integer to process, then stores your entry as a label in the cell named *octal*.

{LET octal,@STRING(@VALUE(octal),0)} changes the entry in *octal* from a label, or string, to a value and then back to a label. This double change places *ERR* in *octal* if your entry is not numeric. If the entry is numeric, this command strips off any commas or dollar signs and converts numbers entered in scientific notation to simple integers. The macro rounds decimal values to the nearest integer and converts the integer. This command limits the size of your octal entry to 16 digits, so you may wish to

omit it in your macro. If you do omit it, be sure that you enter only octal numbers that don't contain dollar signs, commas, or decimal points.

{IF @ISERR(octal){BRANCH fail} determines whether the cell named *octal* returns *ERR*. If *octal* does contain *ERR*, macro control passes to the cell named *fail*, and the macro stops. If *octal* does not contain *ERR*, macro control passes to the command in cell B11. If you omit the previous step from your macro, omit this step also.

{IF #NOT#@ISERR(@FIND("8",octal,0))}{BRANCH fail} transfers macro control to the cell named *fail* if any digit in your octal entry is 8. The routine named *fail* enters @ERR in the cell named *decimal* and stops the macro. This and the following line of the macro ensure that your entry contains no invalid digits.

{IF #NOT#@ISERR(@FIND("9",octal,0))}{BRANCH fail} transfers macro control to *fail* if your octal entry contains a 9. You can omit this and the previous step if you trust you'll never accidentally enter invalid digits in your octal values.

{LET decimal,0}{CALC} sets the value of *decimal* to 0 and recalculates the worksheet.

{FOR cntr,1,digits,1,run} runs the subroutine named *run* one time for each of the digits in the octal entry. The routine named *run* calculates the base-10 value of a single digit in *octal* and adds that value to the value in the cell named *decimal*. Each time the *run* routine is repeated, the macro calculates a different digit's base-10 value and adds the result to *decimal*. When 1-2-3 has processed all the digits in *octal*, *decimal* contains the absolute decimal equivalent of the octal value. Macro control passes to the commands in cell B15.

{IF @CODE(octal)=45}{LET decimal,-decimal} changes the value in *decimal* to a negative number if the first character in *octal* is a minus sign.

{GOTO)decimal~ moves the cell pointer to *decimal* to highlight the macro's result.

This technique does not work in 1-2-3 Release 1A.

MAKING CENTS

I have long been frustrated by the need to type decimal points when entering accounting figures. I recently solved the problem with the following macro:

	A	B	C	D	E	F
1	\c	{?}* .01{CALC}~				
2		{IF @CELLPOINTER("type"=" ")/RE" (QUIT)				
3		(DOWN){BRANCH \c}				

To create the macro, enter labels as shown and assign \c as the name for cell B1. To use the macro, move the cell pointer to the top of a column that will receive your input, then press MACRO-C.

Type a value such as 893 to represent the intended entry of 8.93. When you press Return, the macro converts the entry and enters it into the current cell. Then the cell

pointer moves down, and the macro pauses so that you can make the next entry. When you've finished making entries, stop the macro by pressing Return twice. Here's how the macro works:

{?}.01{CALC}~ pauses for user input, multiplies the incoming entry by .01, and enters the result of the multiplication into the current cell.

{IF @CELLPOINTER("type")="I"}RE~{QUIT} erases the current cell and stops the macro if you pressed Return without making a numeric entry.

{DOWN}{BRANCH \c} moves the cell pointer down one cell and restarts the macro.

This technique does not work in 1-2-3 Release 1A.

L. D. Mashburn
Marietta, Ga

PAGING THROUGH GRAPHS BOTH WAYS

I have a macro that displays a series of graphs one by one. The macro uses an @INDEX function that refers to a table of graph names and a {FOR} loop that changes the row reference of the @INDEX function. With each cycle of the loop, the macro displays the next graph in the list of names.

This macro works reasonably well, but I want to modify it so that I can walk through the list in either direction. I would like to be able to press the plus key to view the

next graph and the minus key to view the previous graph. How can I modify my macro to do this?

Jim Boulton
Dyncorp
Albuquerque, N.M.

The editor replies: The {FOR} command is fine if you want to page straight through a series of graphs, but you need a different approach to move back and forth within the series. Your macro should govern the @INDEX formula with a {GET} command rather than a {FOR} loop.

To see how this technique works, enter the labels, as shown in the following illustration, but omit the entry shown in red. This is a formula that you'll enter in a

	I	J	K	L	M	N
1	key					
2	num					
3	indx	first	— block			
4						
5	\n					{PANELOFF}{WINDOWSOFF}
6						{LET num,0}/G
7	loop					{RECALC block}
8						NU(indx){GET key}
9						{IF key="+"}{LET num,num+1}
10						{IF key="-"}{LET num,num-1}
11						{IF num<0}{LET num,ROWS(list)-1}
12						{IF num@ROWS(list)-1}{LET num,0}
13						{IF key="+"}{OR#key="q"}{ESC 2}{QUIT}
14						{BRANCH loop}

Mail smarter and save money on your PC using the One-Two Power Punch

ArcList®—your first punch—lets you professionally manage your list on your IBM or compatible PC with 640K RAM and a hard disk.

SAVE MONEY:

- eliminate duplicates from dBase®, ASCII or ArcList files;
- take advantage of postal discounts by presorting according to USPS regulations.

AccuMail™—your second punch—lets you:

- easily knockout undeliverables with automatic address correction features;
- quickly knock down postal costs by inserting carrier route and ZIP+4 Codes into your existing dBase, ASCII or ArcList files.

Find out more about ArcList and AccuMail! For a FREE copy of "How to Manage Your Mailing List" call 1-800-368-5806 or write:

Group 1 Software, Inc.
Washington Capital Office Park
6404 Ivy Lane, Dept. LTM-5
Greenbelt, Maryland 20770-1400

GROUP 1
GROUP 1 SOFTWARE

The Direct Marketing Software Company

- ☐ Please rush me a FREE copy of "How to Manage Your Mailing List."
- ☐ I'm ready to see ArcList and AccuMail in action. Please contact me at once.

Name _____

Title _____

Organization _____

Street _____

City _____

State _____ Zip _____

Telephone (_____) _____

©1989 Group 1 Software, Inc.

LTM-5

Call for the dealer nearest you.

moment. Use the Range Name Labels Right command to assign the labels in column I as names for the adjacent cells of column J. Then use the Range Name Create command to assign the name *block* to range J2..J3.

Before you run the macro, you'll need to create and name several graphs. For this discussion, create graphs of your own design, using the Graph Name Create command to name each one in turn. In preparing this example, we created seven graphs and named them *first*, *second*, *third*, and so on. Once you've named several graphs, enter the list of graph names in the worksheet to resemble the list we've shown in the following illustration:

	N	O	P	Q	R	S
1	list					
2	-----					
3	first					
4	second					
5	third					
6	fourth					
7	fifth					
8	sixth					
9	seventh					

Assign the name *list* to the range that contains the graph names. In our illustration, it is range N3..N9. Finally, enter the formula `@INDEX(list,0,num)` into the cell named *indx*, cell J3.

To run the macro, press **MACRO-N**. *I-2-3* displays the first of the graphs in your list. Now for the annoying part: Although pressing the plus key causes *I-2-3* to display the next graph in the sequence and pressing the minus key causes the previous graph to appear, you must press each key twice to make these changes. The first keystroke removes the graph from the screen. The second keystroke tells the macro which graph to show next. To stop the macro, you can press either **Q** twice or the Return key twice.

The macro relies on the formula in the cell named *indx*. That formula is an `@INDEX` function that returns a label from the range named *list*. When the value of *num* is 0, the `@INDEX` function returns the first name from the list, in this case, *first*. When the value of *num* is 1, the function returns the second name from the list, and so on. The macro controls this mechanism by increasing or decreasing the value of *num*, depending on which key you press. Here's how it works:

`{PANELOFF}{WINDOWSOFF}` disables screen updating so that the screen will remain blank between graph displays. Without this step, the worksheet would reappear momentarily after you press the plus or minus key.

`{LET num,0}/G` sets the value of *num* to 0, presses slash, and selects Graph from the menu.

`{RECALC block}` recalculates the range named *block* to update the formula in *indx*, based on the current value of *num*.

`NU{indx}~{GET key}` selects Name Use from the Graph menu, calls *indx* as a subroutine, presses Return, then pauses until you press a key. By calling *indx* as a subroutine, the macro enters whatever graph name ap-

pears in *indx* as the name of the graph to display. That graph appears on-screen and the macro pauses. When you wish to view a different graph, press either the plus key or the minus key twice. The first press clears the graph, and the macro stores the second press as a label in the cell named *key*.

`{IF key="+"}{LET num,num-1}` decreases the value of *num* by one if *key* contains a minus sign.

`{IF key="+"#OR#key="="}{LET num,num+1}` increases the value of *num* by one if the entry in *key* is either a plus or an equal sign.

`{IF num<0}{LET num,@ROWS(list)-1}` sets the value of *num* to one less than the number of rows in *list* if the value of *num* is already less than zero. This prevents *num* from becoming negative and causes the macro to jump from the first graph to the last in the list if you press the minus key while viewing the first graph.

`{IF num>@ROWS(list)-1}{LET num,0}` sets the value of *num* to 0 if *num* is already greater than one less than the total number of rows in *list*. This causes the macro to display the list's first graph if you press the plus key while viewing the last graph in the list. This and the previous macro step let you scroll through the graphs to your heart's content in either direction.

`{IF key="~"#OR#key="q"}{ESC 2}{QUIT}` presses Escape twice and stops the macro if you've either pressed the Return key or typed a **Q**. The worksheet reappears, and *I-2-3* returns to Ready mode. This command has no effect if you've pressed the plus or minus key.

`{BRANCH loop}` transfers macro control to the command in the *loop* cell. The `{RECALC}` command in *loop* updates the formula in *indx*, based on the new value of *num*. Then the macro displays the next graph in the sequence. It pauses so that you can view the graph, and so on.

This technique does not work in *I-2-3* Release 1A.

SAVING GRAPHS

I've written a macro that performs a complex series of tasks. One line of the macro saves the current graph to a file named by the user:

```
/GS{?}~Q
```

The commands work fine as long as the user supplies a file name not already in existence in the default directory. How can I get the macro to save the graph whether or not the file already exists?

Douglas A. Barton
National Council of the Paper Industry for
Air and Stream Improvement
Medford, Mass.

The editor replies: Try the following commands:

```
/GS{?}~R{ESC}QN{ESC}
```

Be aware that using this technique can result in inadvertent erasure of valuable graph files. The macro doesn't warn you when you indicate the name of a previously saved file. It simply replaces the file. ■

	1986	1987	1988
Grant Exchanges (Note E)		\$20,500	\$17,500
Improvements	\$184,576	\$176,549	\$97,645
Installations (Note F)	\$4,500	\$17,500	
Additions to fixed assets			

Statement of Income		1988
Income from operations		\$1,133,975
Interest and dividends		\$76,133
Income before income taxes		\$1,270,108
Provision for income taxes		\$472,008
Net income		
Earnings per share		

At Cost Depreciation		1988
Summary Schedule:		
Land	\$258,007	
Buildings	\$670,330	
Furniture	\$72,044	
Machinery		
Other equipment		
Furniture		
Land		
Buildings		
Furniture		
Machinery		
Other equipment		

For Year Ended		1986	1987	1988
Sources of working capital:				
Net income		\$682,094		
Non-fund charges to income:				
Deferred income taxes			\$17,568	
Depreciation and amortization			267	
Working capital from operations			\$383,654	
Sale of fixed assets			\$37,699	
Issuance of common stock			\$34,866	
Issuance of preferred stock				
Total sources			\$444,219	
Uses of working capital:				
Additions to fixed assets		\$106,834	\$66,919	\$125,639
Dividends paid on capital stock		\$38,764	\$89,523	\$117,690
Total Uses		\$254,674	\$378,991	\$348,572
Increase in working capital		\$727,527	\$480,187	\$627,647

Look&Link

Add-in for 1-2-3

With dynamic linking you can build giant 1-2-3 applications and you'll never run out of memory. Values from linked sheets automatically feed into the primary sheet.

Boundless Worksheets.

LOOK&LINK™ for 1-2-3® Release 2 lets you build applications that span across worksheets. You get dynamic linking and consolidation plus the ability to see two sheets on the screen at the same time.

Be in two places at once.

Have you ever wanted to look at one worksheet while using another? Now you can. A special pop-up window lets you see a second worksheet with the push of a key.

Build multi-sheet applications.

With LOOK&LINK, any worksheet can pull information out of other worksheets on disk or expanded memory (optional). You might link a 1040 tax worksheet to its supporting schedules.

Link a cell or a range. Link values or summary information. Perform table lookups. It's easy — move the cursor in the pop-up window to define the link cells.

Consolidate many sheets into one.

LOOK&LINK also does automatic consolidations, complete with audit trail. You might sum twelve monthly P&Ls to create an annual report or sum

regional sales worksheets to produce a national consolidation.

LOOK&LINK is from the makers of @BASE™, SeeMORE™ SmartNotes™ and UltraVision™ for the IBM PC and compatibles.

Look&Link

Please send me:

_____ copies of LOOK & LINK at \$99.95 each.
Include \$3.75 shipping per order. (\$12 outside USA and Canada). Mass. residents add 5% sales tax.

Payment: ☐ VISA ☐ MC ☐ AMEX
☐ DINERS ☐ CHECK

CARD# _____ EXP DATE _____

NAME _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____ ZIP _____

To order, send coupon or call toll-free.
Company PO's accepted by mail or fax.

800-445-3311

personics

63 Great Road, Maynard, MA 01754
608-897-1575 FAX 508-897-1947

For Year Ended December 31st		1986	1987	1988
Statement of working capital:				
Net income		\$682,094		
Non-fund charges to income:				
Deferred income taxes			\$17,568	
Depreciation and amortization			267	
Working capital from operations			\$383,654	
Sale of fixed assets			\$37,699	
Issuance of common stock			\$34,866	
Issuance of preferred stock				
Total sources			\$444,219	
Uses of working capital:				
Additions to fixed assets		\$106,834	\$66,919	\$125,639
Dividends paid on capital stock		\$38,764	\$89,523	\$117,690
Total Uses		\$254,674	\$378,991	\$348,572
Increase in working capital		\$727,527	\$480,187	\$627,647

Western Region Sales		Cash	Installment	Total
Product Sales		250,000	150,000	400,000
Service Sales		100,000	50,000	150,000
License Sales		50,000	25,000	75,000
Other Sales		25,000	12,500	37,500
Total Sales		425,000	237,500	662,500
Cost of Sales		212,500	118,750	331,250
Gross Profit		212,500	118,750	331,250
Operating Expenses		100,000	50,000	150,000
Net Income		112,500	68,750	181,250

You can scroll up, down, left or right, move and resize the window, swap sheets between windows, and cut and paste between sheets. And that's just the beginning.

SYMPHONY MACROS

FROM THE POINTER'S VIEW

The @CELLPOINTER function lets your macros "see" what they're doing.

BY NICK DELONAS

Macros often make decisions about what to do. For example, a macro might recalculate a data table if the value in the cell named *totals* is greater than 500. Or a macro might prompt you to enter a date if the cell named *date1* contains no data.

While making decisions based on data in named cells is common, sometimes a macro must make a decision based on some aspect of the cell the macro is working on. That is, the macro must know something about the contents of the cell holding the cell pointer. Does the cell contain a zero? Then erase it. Is the cell's width narrower than five characters? Then widen the column.

The tool that lets a macro examine the current cell isn't a macro command at all. Rather, a macro relies on the @CELLPOINTER function to learn details about a cell. This article puts the @CELLPOINTER function to use in macros that erase unprotected cells, move the cell pointer to selected columns, and perform general maintenance on the worksheet.

THE FUNCTION REVEALED

The @CELLPOINTER function provides information about the cell that currently contains the cell pointer. The function has the syntax @CELLPOINTER("attribute"). The variable *attribute* is any one of a number of code words

that identify the type of information the formula will yield. For example, the formula @CELLPOINTER("row") returns a value that represents the row number of the cell holding the cell pointer. There are nine attribute codes to choose from:

Code	Result
"address"	absolute address of current cell
"row"	number of current row
"col"	number of current column
"format"	format of current cell
"width"	width of current column
"type"	"b" if current cell is blank "v" if current cell contains a value or formula "l" if current cell contains a label
"prefix"	label prefix of current cell, or null string for nonlabel cells
"protect"	the value 1 if the cell is protected; the value 0 if the cell is unprotected
"contents"	current value of current cell

Consider a small example of the @CELLPOINTER function. Suppose you are working on a data-entry worksheet in which all the labels and formulas are protected and all the data-entry cells are unprotected. After you perform data entry and analysis, you may sometimes wish to erase the entries from the data-entry area and leave the worksheet blank to receive a new set of entries. The following simple worksheet represents this data-entry scenario.

To create the worksheet, enter the labels and values into range A4..A7, as shown in the figure. Then enter the formula @SUM(A5..A6). into cell A8. Unprotect cells A5 and A6, as these are the cells whose entries you'll wish to replace from time to time. To unprotect cells, select MENU Range Protect Allow-Changes and indicate the cells you wish to unprotect.

Now in this worksheet create the macro shown in the following illustration. This macro uses the @CELLPOINTER function with the "protect" code and erases all entries in unprotected cells.



A	
4	May
5	258
6	325
7	=====
8	583

	A	B	C	D	E	F
1	\d	{IF @CELLPOINTER("protect")=0}{MENU}E"				
2		{DOWN}{BRANCH \d}				

To create the macro, enter labels as shown and use the Range Name Labels Right command to assign the label in cell A1 as the name for the adjacent cell of column B. Remember to type an apostrophe before entering \d. Move the cell pointer to the first entry in the data-entry area of column A (cell A4), and run the macro by holding down the MACRO key (Alt on most computers) and pressing D. To stop the macro when it has erased all appropriate entries in the column, hold down the Control key and press Break. Clear the resulting error by pressing Escape.

Here's what the macro does:

{IF @CELLPOINTER("protect")=0}{MENU}E~ erases the contents of the current cell if cell protection is set to Allow-Changes. The expression @CELLPOINTER("protect")=0 returns 0 if the current cell is protected and 1 if the cell is not. If the expression evaluates to 1, the {IF} command passes macro control to the remaining macro commands in the cell containing the {IF} statement. If the expression evaluates to 0, macro control skips further commands in the {IF} command's cell and passes directly to the next cell of the macro.

{DOWN}{BRANCH \d} moves the pointer down one cell and restarts the macro. The macro erases the next cell in the column if the cell is unprotected, moves the cell pointer down, and so on until you stop it.

MOVING TO A SPECIFIC COLUMN

Suppose you are entering data in several adjacent columns and you occasionally need to enter an annotation in column A of the current row. The macro below performs these steps: It moves the cell pointer to column A, pauses so that you can make an entry, and then moves the cell pointer back to where it was when you started the macro.

To create the macro, enter labels as shown in an otherwise blank worksheet. Then use the Range Name Labels Right command to assign the labels in column A as range names for the adjacent cells of column B. To try the macro, move the pointer to a cell in column E and enter any number. When you press MACRO-L, the cell pointer jumps to column A. Enter any label and press Return; the

	A	B	C	D	E	F
1	temp					
2	\l	{LET temp,@CELLPOINTER("col")}				
3		{LEFT temp-1}{?}{RIGHT temp-1}				

cell pointer returns to the entry you made in column E.

Here's how the macro works:

{LET temp,@CELLPOINTER("col")} places the column number of the current cell in *temp*. *Symphony* counts column A as 1, column B as 2, and so on.

{LEFT temp-1}{?}{RIGHT temp-1} moves the cell pointer to column A, pauses for your input, then moves the pointer back to its original position. With the cell pointer in column E, *temp* contains 5, so the macro moves the cell pointer to the left 5-1, or 4, columns. This places the pointer in column A. Moving the pointer to the right *temp-1* columns returns the pointer to column E.

@CELLPOINTER UNLEASHED

To illustrate the full power of the @CELLPOINTER function, we created a macro that automatically updates every cell in any worksheet. The macro erases all cells contain-

	A	B	C	D	E	F	G	H
1	done							
2	last							
3	count							
4								
5	\d	{END}{HOME}{RECALC rang}{LET last,@CELLPOINTER("row")}						
6	rang	{LET done,@COUNT(A1..SAS1)}{HOME}						
7		{FOR count,1,done,1,run}						
8		{HOME}{BEEP}{BEEP 4}{BEEP}						
9								
10	run	{IF @CELLPOINTER("type")="b"}{empty}						
11		{IF @CELLPOINTER("format")="D3"}{DOWN}{CALC}{-}{BRANCH skip}						
12		{EDIT}{HOME}"}						
13		{IF #NOT#ISERR(GVALUE(@CELLPOINTER("contents")))}{MENU}E"						
14		{IF @CELLPOINTER("type")<>"b"}{EDIT}{HOME}{DELETE}"}						
15		{IF @CELLPOINTER("type")="l"}{align}						
16		{IF @CELLPOINTER("type")="v"}{value}						
17	skip	{IF @CELLPOINTER("row")=last}{RIGHT}{END}{PGUP}{RETURN}						
18		{IF @CELLPOINTER("row")<last}{DOWN}						
19								
20	empty	{IF @CELLPOINTER("type")="b"}{END}{DOWN}						
21		{IF @CELLPOINTER("type")="b"}{RIGHT}{END}{PGUP}{empty}						
22								
23	align	{IF @CELLPOINTER("prefix")="l"}{prop}						
24		{IF @CELLPOINTER("prefix")="r"}{prop}{MENU}RLC"						
25		{IF @CELLPOINTER("prefix")="m"}{prop}{MENU}RLL"						
26		{IF @CELLPOINTER("contents")=""}{MENU}E"						
27								
28	prop	{RECALC prop}{LET SAS1,"done"}						
29		{MENU}RV"						
30								
31	value	{IF @CELLPOINTER("format")="G"}{MENU}FP2"						

ing values, makes sure that each label begins with a capital letter followed by small letters, centers all left-aligned labels, left-aligns all right-aligned labels, erases all null strings (""), changes all formulas with a general format to a punctuated format with two decimal places, and replaces all dates with today's date.

You may never want to perform exactly these maintenance tasks, but the macro is representative of utilities that you might create for your own worksheets. You could use some more-advanced techniques to shorten the macro, but we chose this design to illustrate a wide range of @CELLPOINTER applications.

To create the macro, enter labels as shown, omitting for now entries printed in red. Use the Range Name Labels Right command to assign the labels in column A as

names for the adjacent cells of column B. Then enter the following formulas in the cells indicated (cell B28 initially returns ERR):

Cell	Formula
B6	+("{LET done,@COUNT(A1..& @CELLPOINTER("address")&)}{HOME}")
B28	+("{RECALC prop}{LET "&@CELLPOINTER("address")&","&@PROPER(@CELLPOINTER("contents"))&"}")

Now move range A1..B31 into Hyperspace (see the box on page 40). The macro will not work properly if you leave it in the worksheet.

To provide a worksheet in which to test the macro, follow the instructions in the setup box on this page and create the following template:

	A	B	C	D	E
1					Jan-88
2					-----
3	Code:	Indra	Agni	Vayu	
4	Point1	3900	700	6300	
5	Point2	7200	5100	7100	
6	point3	1600	1600	3600	
7	Point4	5300	7600	3200	
8		estimate	actual	Estimate	
9	Point5	7200	3000	5700	
10					
11	Avg:	5040	3600	5180	
12	dev:	2122.82830	2490.78300	1524.99180	
13	Sum:	25200	18000	25900	
14					
15		Employees	Jan-88		
16					-----
17		Phil	wendy	steve	
18	Credits:				
19	bonus:	\$32	\$262	\$636	

Now run the macro by pressing MACRO-D. Your screen will flicker as the cell pointer flits from cell to cell, and in a few moments the macro will tidy up the worksheet. Here's how the macro works:

{END}{HOME}{RECALC rang}{LET last,@CELLPOINTER("row")}

moves the pointer to the bottom-right cell of the current window's active area, recalculates

the formula in *rang*, and stores the row number of the bottom-right cell in the cell named *last*.

The formula in *rang* reads + "{LET done,@COUNT(A1..&@CELLPOINTER("address")&)}{HOME}". It uses the @CELLPOINTER function in conjunction with an @COUNT function to determine the number of nonblank cells in the window. The macro places the result of this calculation in the cell named *done*, then presses the Home key and moves the cell pointer to the window's top-left corner.

{FOR count,1,done,1,run} controls a FOR loop. A FOR loop is a collection of commands that *Symphony* processes a predetermined number of times. In this case, *Symphony* processes the routine named *run* as many times as there are cell entries in the current window.

Here's what the routine named *run* does:

{IF @CELLPOINTER("type")="b"}{empty} calls the subroutine named *empty* if the current cell is blank, then moves the pointer to the next entry in the worksheet. We explain the *empty* subroutine's operation in "The Empty Subroutine" section.

{IF @CELLPOINTER("format")="D3"}@NOW{CALC}~{BRANCH skip} enters today's date in the current cell if the cell has a Date 3 format, then passes macro control to the cell named *skip*. If the current cell doesn't have a date format, the macro doesn't enter a date, and control passes to the commands in the following cell (cell B12 in the illustration).

{EDIT}{HOME}~ presses the EDIT key and enters an apostrophe at the beginning of the cell entry. This changes any formula or value to a label.

{IF #NOT#@ISERR(@VALUE(@CELLPOINTER("contents")))}{MENU}E~ erases any cell that contained a value before the previous macro instruction added a label prefix. The @CELLPOINTER function can't distinguish a formula from a value. The macro makes the distinction by changing values and formulas to labels, then applying an @VALUE function to the resulting string. If the cell originally contains anything but a value, the @VALUE function returns ERR. If the @VALUE function does not return ERR, the macro erases the current cell.

HOW TO SET UP THE WORKSHEET

1. Default settings

Column width: 11

Select MENU Settings Width, enter 11, select Quit

2. Cell formats

Format	Range
Date 3	C1, C15
Currency 0	B19..D19

For example, to set the format for cell C1, select MENU Format Date 3, indicate cell C1, and press Return.

3. Labels

Enter all labels shown in the figure on this page. To create rows of dashes, enter ~ in cell A2 and copy to ranges B2..D2 and A16..D16. Enter an empty string in cell A8: Move the cell pointer to cell A8, press the Spacebar, and press Return.

4. Values

Enter all values printed in black in the figure on this page.

5. Enter and copy formulas

Cell Formula

B11 @AVG(B4..B7,B9)

B12 @STD(B4..B7,B9)

B13 @SUM(B4..B7,B9)

B19 @ROUND(@RAND*1000,0)

C1 @DATE(88,1,1)

Copy range B11..B13 to range C11..D11. Copy cell B19 to range C19..D19. Copy cell C1 to cell C15.

Funk Software continues to forge Sideways.

Let Sideways take your printouts to new widths.

Each day, more people turn to Sideways® for printouts of nearly everything that's too wide for a printer. No wonder.

Nothing's as fast or easy. And nothing makes great-looking one-piece printouts that go on this wide. So you get spreadsheets that really spread out. Pert charts that peer far into the future. All kinds of extra-wide printouts without staples, glue or tape. And the newest Sideways makes even shorter work of those wide 1-2-3® printouts.

New Sideways version 3.2 runs right inside 1-2-3.

Sideways now works as a full-fledged add-in to 1-2-3 release 2. As well as Symphony®. So the instant you're done creating your spreadsheet,

you're ready to print with Sideways. Right from your Lotus session. Just select Sideways from your Lotus menu, highlight a range and print.

Mix bold, underlined and italic type, all on the same page. Print through or skip over perforations. Add borders, change page size, adjust margins any way you like. And do it all from Sideways menus that look and act just like Lotus itself.

Sideways leaves no text un-turned.

Spreadsheets, databases, word processors, project planners. Sideways is the right way to print with all your software.

Choose from nine different typestyles from "minuscule" to "mammoth." Print bold, underlined or expanded—whatever your software can create.

New Sideways Version 3.2 for the IBM® PC and all popular dot matrix printers, as well as the LaserJet Plus/Series II. Available at software dealers nationwide, or directly from Funk Software with your check, Visa or MasterCard.

More than ever, Sideways is the only way to go.

Special Upgrade Offer!

Just send us your current Sideways program disk along with \$20. We'll send you new Sideways version 3.2 right away.

**FUNK
SOFTWARE**

SIDEWAYS

- ☐ Please send me _____ copies of new Sideways version 3.2 at \$69.95 each.
 - ☐ Please send me a Sideways version 3.2 upgrade kit for \$20.
- My current Sideways program disk is enclosed.
- ☐ My check is enclosed. Charge my ☐ Visa ☐ MasterCard

Account number _____ Exp. date _____

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

To order call 1-800-822-3865, Ext. 246
(617-497-6339 in MA)

New Sideways version 3.2 works with all releases of 1-2-3 as well as other software. Add-in capability requires 1-2-3 release 2 or Symphony.

Funk Software, 222 Third Street, Cambridge, MA 02142
© 1987 Funk Software. Sideways is a registered trademark of Funk Software, Inc.

STORE YOUR MACROS IN HYPERSPACE

Hyperspace is a nickname for the *Symphony* Macro Library Manager, an add-in that lets you store macros in RAM, independent of any worksheet. The Macro Library Manager is available for *Symphony* Releases 1.1 and higher. You copied the add-in to your hard disk when you first installed *Symphony*. If you don't have a hard disk, you'll find the add-in on *Symphony's* Help and Tutorial Disk. Insert that disk in drive A before you continue with this discussion.

To be able to use Hyperspace, you must first attach the Macro Library Manager: Select SERVICES Application Attach, then select MACROMGRAPP from the menu of add-in names that appears in the control panel. Select Quit to exit from the menus.

Now retrieve the worksheet that contains your macros. To put your macros into Hyperspace, select SER-

VICES Macros Save, enter a name for the library, and indicate the range that contains the macros and all supporting named cells. For this discussion, elect not to use a password to protect the library. The macros vanish from the worksheet as *Symphony* puts them into Hyperspace.

When you send a macro library into Hyperspace, *Symphony* saves a copy of the library to disk and stores another copy in RAM, independent of the worksheet. The library remains in RAM throughout the current work session unless you remove it by using the SERVICES Macros Remove command. When you want to use the macro library in a later session, attach the Macro Library Manager, select SERVICES Macros Load, select the library's name from the list that appears in the control panel, then select Quit. —Daniel Gasteiger

{IF @CELLPOINTER("type")<>"b"}{EDIT}{HOME}{DELETE}~ presses the EDIT key and deletes the leading apostrophe if the current cell is not blank. In other words, if the previous line of the macro didn't erase the current cell, then the macro needs to remove the apostrophe it placed at the beginning of the entry.

{IF @CELLPOINTER("type")="l"}{align} calls the subroutine named *align* if the current cell contains a label. *Align* (described below) capitalizes the first letter of each word in a label and readjusts the label's alignment.

{IF @CELLPOINTER("type")="v"}{value} calls the subroutine named *value* if the current cell contains a formula. *Value* assigns a new cell format if the current cell has the General format.

{IF @CELLPOINTER("row")>=last}{RIGHT}{END}{PGUP}{RETURN} moves the cell pointer to the top of the next column and ends one pass of the routine named *run* if the cell pointer is at or below the last row of the window's active area.

{IF @CELLPOINTER("row")<last}{DOWN} moves the pointer down a cell if it hasn't yet reached the bottom of the window's active area.

THE EMPTY SUBROUTINE

The macro calls the subroutine named *empty* when the current cell is blank. The *empty* subroutine finds the next cell that contains an entry. It locates the next entry by using the {END}{DOWN} command combination. When the cell pointer is in a blank cell, pressing the End key followed by the DownArrow key moves the pointer to the next entry in the column or to the last row of the current window.

If processing the {END}{DOWN} command sequence moves the cell pointer to a blank cell, the macro knows that there are no more entries in the current column. The cell pointer jumps to the top of the next column. And if the first cell of the new column is blank, the routine

named *empty* restarts itself to continue its search for a nonblank cell. Here's how the routine works:

{IF @CELLPOINTER("type")="b"}{END}{DOWN} presses the End key and then the DownArrow key if the current cell is blank.

{IF @CELLPOINTER("type")="b"}{RIGHT}{END}{PGUP}{empty} moves the cell pointer to the top of the next column and reruns the routine named *empty* if the current cell is blank. By running the *empty* routine a second time, the macro searches for a nonblank cell in the new column. If the cell pointer comes to rest in a nonblank cell, the subroutine ends and macro control returns to the commands of the routine named *run*. Note that the macro will crash if the window contains more than 29 blank columns between columns that contain data. In most worksheets this limitation is unimportant.

THE ALIGN AND VALUE SUBROUTINES

The subroutine named *align* capitalizes entries, checks for and erases null strings, and readjusts label alignment. The macro processes this routine only if the current cell contains a label entry. Here's how the routine works:

{IF @CELLPOINTER("prefix")="^"}{prop} calls the routine named *prop* if the label is centered. *Prop* capitalizes the first letter of each word in the label and makes all other characters lowercase.

{IF @CELLPOINTER("prefix")=""}{prop}{MENU} RLC~ calls the routine named *prop*, then centers the label if the label is originally left-aligned.

{IF @CELLPOINTER("prefix")="^"}{prop}{MENU} RLL~ calls the routine named *prop*, then left-aligns the label if the label is originally right-aligned.

{IF @CELLPOINTER("contents")=""}{MENU}E~ erases the current cell if it contains a null string.

After the FOR loop has finished processing, the macro moves the pointer to cell A1, and your computer beeps to alert you that the macro has finished. ■

Finally, dBASE® and Lotus® have something in common.

Database reports without programming— with R&R report writers.

R&R helps you create reports quickly, without programming, directly from related databases. Use for turnkey systems and ad hoc reporting. Print in any layout, from columnar listings and mailing labels to preprinted forms and form letters. R&R is full-featured and flexible, so you can concentrate on making reports show exactly what you want to show, in exactly the way you want to show it. Any report.

Perform calculations as needed, including totals and subtotals. Sort and group records in any order. Select records with plain-English query. Save time with automatic TRIM, word-wrap, justification, currency, and date formats. Improve appearance with bold, *italics*, underline, different fonts, and graphics characters.

Lotus-like menus, WYSIWYG screen-painting, and HELP system make it easy to learn R&R. And since R&R report writers look alike, when you've learned one you know them both.

R&R Relational Report Writer™

Works with dBASE III, dBASE IV, dBaseXL™, Quicksilver™, and file-compatibles. Includes royalty-free runtime that requires only 25 KB of memory. Network support standard. Clipper® and FoxBASE+™ Module required for .NTX and .IDX indexes, \$49.95.

For
dBASE III®
and
dBASE IV™.
\$149



"... a stunning combination of a comfortable and informative user interface, supremely easy access to multiple related files, and extensive report design and enhancement tools. Usable by novice and expert alike, it is superb for generating either straightforward or complex report output...." 12/8/87.

One of "The 100 Top-Rated Products of 1987."
InfoWorld, 12/28/87.



Awarded Most Useful Add-On Product for dBASE by 1988 dBASE Developer Conference attendees. Ashton-Tate, September 1988.

R&R Worksheet Report Writer™

Works with Lotus database worksheets or ranges. Works as add-in or add-on with 1-2-3, Symphony, and worksheet-compatible products. Requires 20 KB as add-in. Network support standard. Replaces Lotus 1-2-3 Report Writer™, and includes program to convert existing reports to R&R.

For
Lotus 1-2-3®
and
Symphony®.
\$149

R&R report writers—
the standard for database reporting!

CIRCLE 113 ON READER SERVICE CARD

30-Day Moneyback Guarantee!

To order, or for more information and the name of the dealer nearest you, call:

800-325-9035

in Mass., call 508-366-1122.

Concentric Data Systems, Inc.
18 Lyman Street, Westboro, MA 01581

Sales
Registers
Invoices
Form Letters
Statements
Mailing
Labels
Aged
Receivables
COD Tags
Purchase
Orders
Customer
Lists
Telephone
Directories
Sales
Analyses
Advertising
Schedules
and more

23340	06/06/88	Adult Property		
23340	06/06/88	Full Mouth X-Ray	00210	19.00
	06/15/88	Check #428		
	06/15/88	Silver amalgam	02120	55.00
23467	06/15/88	Tooth #12		
	06/15/88	Silver amalgam	02120	55.00

Paty Hollender
Auto Corporation
7400 Service Rd.
Ann Arbor, MI 48106



Avoid the ins and outs of

Today's manager has to juggle dozens of different tasks. But dealing with the ins and outs of different software packages shouldn't have to be one of them.

Now there's Framework III™, the one program that does everything a manager needs to do. Framework III is a tightly linked set of the six most often used functions you'll find on a computer: word processing, spreadsheet, database, outlining, graphics and communications.

That means you'll always have easy access to all your information. Because you always use the same, easy-to-learn interface—no matter what the task at hand. Or how many tasks you have to do at the same time.



See what you've been missing.

The result? You can concentrate on managing your business. Instead of managing your software.

For example, you can interrupt word processing to log on to a mainframe; get needed data; jump into a spreadsheet; use the data to create a graph; and insert it into your document. Without ever leaving the program. It's that simple.

It's just as easy to transfer files between Framework and other programs, like Lotus 1-2-3® and WordPerfect®. Or use its telecommunications module to access files from other computers or link up to remote databases.

And you won't have any trouble keeping track of it all, because Framework lets you open as many windows as you'd like to—simultaneously.

The program also integrates a speedy spell-checker and thesaurus in its powerful word processor. As well as macros, linking and over 170 functions in the spreadsheet. And a database that reads and writes dBASE® and other files for





other software packages.



Would you rather carry
around six programs or one?

merging into form letters.

What else could a manager possibly want in a software package?

How about an easy-to-use programming language? Framework's FRED® lets you tailor the product to your group's needs. Or you can use one of the many third-party applications.

There's even a version for local-area networks. Framework III LAN simplifies the job of coordinating your workgroup. You can use its built-in electronic mail to circulate memos. Or create complex documents that require input from several people.

What does it all add up to? A product that offers a more efficient way to organize your thoughts, analyze your information and communicate your decisions.

Which is, when you think about it, a more efficient way to manage your business.

Free Video

To get the complete picture of what Framework can do, just call 1-800-437-4329, ext. 3044, and we'll rush you a free videotape that explains it all.

Framework III. It's all the software you'll ever need.



ASHTON-TATE®

Trademark/Owner: Framework III, dBASE, FRED, Ashton-Tate, Ashton-Tate/Ashton-Tate Corporation; Lotus 1-2-3/Lotus Development Corporation; WordPerfect/WordPerfect Corporation.

© 1989 Ashton-Tate Corporation  BY ACTION TECHNOLOGIES

PUSHING 1-2-3 TO ITS LIMIT... AND BEYOND

BY CHRIS BROWN

Two shirtsleeved executives sit side by side. As they peer at a computer monitor, a line slashes upward, across the screen. Their supply suspicions confirmed, they decide to alter the production mix of a Louisiana refinery.

The incident is hypothetical. But something like it happens every day in the Houston headquarters of Conoco Inc., the integrated oil subsidiary of the Du Pont Company that employs 7,000 worldwide. Most of the data that drives business decisions at Conoco

is on computer disks. Most of that computer data is in 1-2-3 worksheet files. Extensive macros translate selected worksheet data into graphs at the touch of a "hot" key. That has been a key part of Conoco's executive information system (EIS) for the past three years.

Conoco must rework part of its executive information system.

At Conoco's Houston headquarters, a complex of 16 buildings, nearly every employee in the force of 2,300 works at a PC on one of 27 interconnected Novell local area networks. Because the data is easily and instantly available at any level of management, the company finds that it can react more quickly than in the past to changing market conditions. And just as important, says John Sauer, general manager of business environment and executive information, "we expect more analysis of every business decision."

Conoco's use of 1-2-3 is not confined to strategic analysis. The EIS grew out of experience with the same financial tasks that made Lotus Development Corp.'s spreadsheet program a corporate standard. As in many

companies, some early users became gurus. And some of those gurus combined macros and enthusiasm to push the program into all corners of the business.

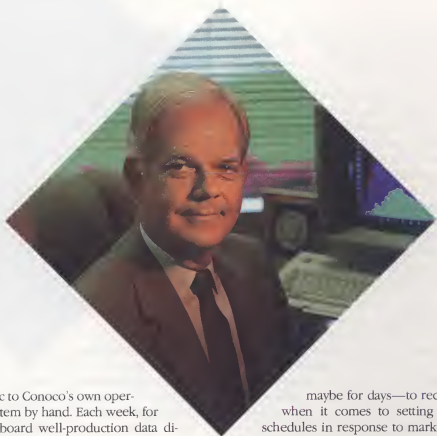
Nearly everyone at Conoco uses 1-2-3, either for data entry, bookkeeping, or analysis. The program's penetration is so complete that wholesale displacement of 1-2-3 in the near future seems unlikely. That's despite disappointment with Lotus's inability to deliver promised upgrades. However, the days of an EIS incorporating 1-2-3 are numbered. As so often happens with 1-2-3 and other spreadsheet programs, its gurus simply pushed it too far. Appetites whetted, Conoco executives now demand a program more suited to their tasks.

CUSTOM PROGRAM DRIVES EIS

Conoco's EIS is based on a custom Turbo Pascal program called Megamenu. Developed by Conoco programmers, Megamenu features direct display of data via hot keys, as well as the ability to load 1-2-3 and display worksheet-based graphs. Figure 1 shows a typical Megamenu screen, which offers executives graphs of industry data based on 1-2-3 worksheets, Turbo Pascal-based graphs created at the touch of a hot key, and other system options.

The data that underlies Conoco's EIS comes from a variety of sources. Much of it is supplied on-line, in an ASCII format, by the American Petroleum Institute (API). A typical set of data covers the domestic seasonal demand for gasoline and natural gas or the amount of crude inventory on hand in the United States.

Conoco downloads the API data into comma-delimited files that can be read by *Paradox*, a PC database program. The files are stored on an 80386 network server. *Paradox* then formats the data for use in 1-2-3 so that it can be imported into worksheet files. Conoco programmers chose *Paradox* over *dBase* because it is easier to program and performs well on a '386-based network.



John Sauer,
general manager of
business environment
and executive information

Other data, specific to Conoco's own operations, enters the system by hand. Each week, for example, clerks keyboard well-production data directly into 1-2-3 worksheets.

Some 60 spreadsheets are available on the EIS, and a series of graphs is associated with each. When Conoco executives want to analyze any of this data, they do not call for printouts or reports. They turn to the keyboard—and do so without reluctance.

One reason is the timeliness of the data. In the past, notes John Sauer, an executive had to formulate a question, ask his staff to do the research, and then wait—

maybe for days—to receive an answer. Now when it comes to setting refinery production schedules in response to market conditions, for example, “we can ask ad hoc questions,” says Sauer, “and get instant answers.”

There are sometimes unexpected paybacks too. When Conoco was negotiating for an exploration permit in Congo, its EIS impressed the executives of the Congolese government. Conoco agreed to furnish the minister of mines and energy with a version of its EIS, industry data, and regular updates. That proved to be an edge that enabled Conoco to beat out its competitors for the Congolese concession.

MAKING IT EASY

Executive acceptance of the keyboard no doubt is higher at Conoco than at many other large corporations. “We’re lucky,” says John Price, manager of information management and one of the architects of Conoco’s EIS. “Our executives have a total awareness of the potential of the PC.” He credits this, in part, to the role that computer technology has long played in the oil business. Conoco has two supercomputers—a Cray and a Cyber—crunching geological data at its Ponca City, Okla., research facility.

Even so, Price went an extra mile or two to encourage executives to turn to their keyboards. The system he designed updates the price of Du Pont stock four times daily. For some executives, Price says, that screen is the first and last to be checked each day. During hurricane season, the system maps storms in the Gulf of Mexico, showing how close they may come to Conoco installations.

More important, Price has made the system a snap to use. That goal was not necessarily uppermost when system development began, but it became uppermost when

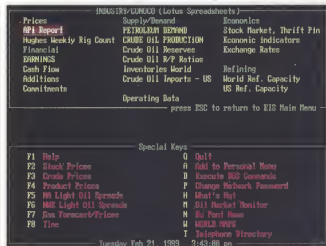


FIGURE 1. This is the main spreadsheet screen in the Conoco EIS. When an executive selects an entry from the upper half of the screen, the 1-2-3 program is loaded, a worksheet is retrieved, and a graph is displayed. Selections from the lower half of the screen include system utilities and graphs that are not based in 1-2-3.

the system came on-line. "From an executive's standpoint," says Price, "the system cannot be too easy to use."

To that end, Price constantly searches for easier ways to create 1-2-3 graphs. It's not much of a trick to write macros that a user can run to create a specified graph automatically. But Price wanted a faster, more responsive 1-2-3 interface for users. So he paid Lotus more than \$10,000 to design a 1-2-3 add-in that provides a custom menu. Now, to order up a graph, Conoco executives simply "point and shoot" (see figure 2).

That makes it a lot easier to mix and match data. For example, an executive can use the menu to select stocks on hand and refinery utilization capacity. Up comes a graph that shows what the relationship is between the current supply of crude oil and the product mix coming out of the company's refineries.

NEEDED: MORE SPEED

On the surface, it's hard to understand why an oil executive would want anything more sophisticated or more responsive. The reason for dissatisfaction becomes a lot clearer, however, when you sit and watch the process. For all the vaunted speed of a '386 computer, and for all the ingenuity of Conoco's PC programmers, the display of 1-2-3 graphs is, well, slow.



Lloyd Belcher (left)
and John Price

The whole point of a graphical display is to show relationships quickly, without forcing a user to look at the underlying data. But 1-2-3 must load itself and the entire underlying worksheet into memory before it can construct a graph. The worksheets in Conoco's EIS typically run 75K to 120K

THE PC ENVIRONMENT AT CONOCO

As in most companies, Conoco's love affair with the PC started at ground level—with users. Depending on the person to whom you speak, the central computer group either quickly recognized and supported the trend or had to be pushed into it.

Morris Helbach, manager of information systems in the central computer department, says his group recognized the trend toward individuals using their own computers around 1982 and began to build up support for PCs. Today, he says, the department provides a support hotline, publishes a list of recommended hardware and software, and offers classroom training. It also puts a major effort into setting network standards.

PC booster John Sauer sees it differently. The central group, known as the computers and telecommunications services department, "did not open its arms to PC users." Rather, he says, in the beginning it was a matter of "breaking their arms" to establish PCs within the company. He feels, however, that the group has responded with some vigor as PCs and spreadsheets have become the company's computing environment.

Monster worksheets

Nowhere in Conoco, however, has any sort of corporate standard for worksheet design been developed. Most of the advanced 1-2-3 users are self-taught, and

worksheets tend to reflect a learn-as-you-go approach. One result is that some worksheets that store oil-well drilling data or the economic model of a country, for example, are—or were—megabytes in size.

The company's analysts and programmers have attacked the problem of worksheet corpulence in two ways. One way is to demand more memory, and especially to push for '386 machines that make it possible to transcend DOS's 640K barrier. The other way is to break up big worksheets into smaller ones, a procedure that has produced heavy reliance on the somewhat awkward File Xtract command. But the fragmentation of worksheets has driven some users to switch to the *Javelin* spreadsheet program.

Javelin supporters point to a number of pluses relative to 1-2-3. Most important is superior file linking. But some also say that *Javelin* does a better job of defining variables and of identifying and locating worksheet errors.

Most 1-2-3 users at Conoco, as elsewhere, would rather wait for improvements in the program they know than learn a new one. The file-linking features promised for Release 3 sound especially attractive.

Meanwhile, Conoco's worksheet manipulators use add-ons or add-ins—commercial or custom—to overcome some of 1-2-3's other limitations. One of the



FIGURE 2. It's easy for Conoco execs to build graphs of the data they want from this 1-2-3 menu. They simply highlight selections and press Return. This "point and shoot" feature is provided by a custom 1-2-3 add-in created for Conoco by Lotus Development Corp.

in size and, when pulled down from the '386 server, typically require about five seconds to load. Only then does the macro that builds the graph go into action, resulting in a total wait time of up to 10 seconds. By forcing 1-2-3 into a presentation role, says Price, "we're using 1-2-3 in a way that was never intended."

Price and his team see no reasonable way to stretch 1-2-3 further in this direction. That's why they are taking a new tack—designing an entirely new graph display "engine" for Conoco's EIS.

The key specification for the new system is presentation speed. "When a senior exec pushes a button," says Lloyd Belcher, coordinator for information management and a member of Price's six-member team, "we must have data on the screen in three seconds or less."

It's Belcher's job to make that happen. To do so, he's had to back away from the spreadsheet format and turn to a database format. The ASCII data files from API will continue to be imported into *Paradox* and 1-2-3 for ad hoc analysis. They will also be used to drive a stand-alone program written in Turbo Pascal. This program will read the ASCII data directly into arrays in memory, select the relevant data points, and generate the graphs.

That's inherently a lot faster than the spreadsheet approach. Belcher, who has a data processing degree and 19 years at Conoco, is confident that he'll achieve the three-second goal. And he notes that the new program also will not be constrained by 1-2-3's limits on types and styles of graphs. The new EIS, he says, should be in place by mid-summer. ■

Chris Brown is LOTUS's senior editor of features.

most annoying of those limitations for EIS users is the need to load the PrintGraph program to produce a hard copy of a graph that's on the screen. Many at Conoco now use a memory-resident program called *Pizazz*, which captures and prints a screen image directly. That and similar solutions keep 1-2-3 responsive to executives' needs. At the same time, such solutions exacerbate the problem of limited system memory.

No cost justification

None of these growing pains seems to have caused top management to consider throttling back the massive PC incursion. Even as the Compaq Deskpro 386/20e with color graphics becomes the standard for top and middle management, the old, displaced '286 machines are finding their way down to first-line managers and support people.

Financially, this is an easy move, since the old machines have been depreciated to a fraction of their original cost. But the trend is also driven by managers who have seen the PC and 1-2-3 boost their own productivity.

John Denton, manager of computer services international, is one executive who can pinpoint such a gain. He built a

worksheet to track the merit salary increases he awards to people in his division. The worksheet makes it possible to cut the expensive mainframe processing time out of the salary-adjustment process. Denton estimates that it saves him two weeks each year that he used to spend preparing, analyzing, and adjusting salary data.

Managers like Denton believe that people farther down the line can achieve similar boosts in productivity. Today, managers are seldom asked to make a case in dollars and cents for PCs. "We don't justify PC use to the extent we did several years ago," says Denton. "Now we assume that every professional in the building should have one."

Nowhere within Conoco has any sort of corporate standard for worksheet design been developed. In fact, most of the advanced users of 1-2-3 are self-taught.

8 Better Ways



There is more than one way to accomplish many *1-2-3* and *Symphony* operations, and often the most obvious way is not the best way. In this article, you'll learn alternative ways of performing common spreadsheet tasks such as calculating running totals, copying and filling

ranges, specifying range names in commands, selectively recalculating formulas, and copying and moving formulas that use absolute and relative references. The techniques presented are helpful because they require fewer keystrokes, occupy fewer cells, or simplify subsequent worksheet changes.

1. Calculate running totals with @SUM functions.

For *1-2-3* and *Symphony* users, calculating running totals for a column of values is a common problem. Suppose, for example, that you want to calculate running totals of the values in range B4..B16 of the worksheet shown in the figure. To do this, you could enter the formula +B4 into cell C4 and the formula +C4+B5 into cell C5. Then you could copy the formula from cell C5 into range C6..C16. Since the formula contains relative references, *1-2-3* or *Symphony* will enter the formula +C5+B6 into cell C6,

the formula +C6+B7 into cell C7, and so on.

These formulas return the correct running totals for the values in range B4..B16. However, you'll run into problems if you delete one or more of the rows that contain these formulas. For example, if you delete the duplicate entry in row 11 of the figure, the formula in C11 (formerly cell C12) becomes +ERR+B11. This occurs because deleting row 11 removed the formula in C11 from the worksheet. Since all subsequent formulas depend on the formula in C11, the formulas in range C11..C15 (formerly C12..C16) return ERR.

You can calculate cumulative totals using @SUM functions, which are not adversely affected by deleting rows within the range that is summed. Make the first @SUM range argument the cell containing the first value in the list. Make the last range argument the cell to the left of the cell into which you enter the function. Make the first range-argument reference absolute and the second relative. Once you have entered the function into the first cell, copy it into the range's remaining cells.

For example, to calculate cumulative totals for the values in range B4..B16, enter the formula @SUM(\$B\$4..B4) into cell C4. Then copy that formula to range C5..C16. Because of the nature of this function's range arguments, *1-2-3* and *Symphony* place the formula @SUM(\$B\$4..B5) into cell C5, the formula @SUM(\$B\$4..B6) into cell C6, and so forth.

These @SUM functions return the correct cumulative totals even if you delete a row. For example, delete row 11 from the worksheet. The formulas in range C11..C15 (formerly C12..C16) adjust to account for deleting the row. They will return ERR if you delete the row that contains the first argument—in this case, row 4.

2. Copy formulas with relative and absolute references.

If you want a copy of a formula that contains relative addresses to reference the same cells as the original formula, you might be tempted to edit the formula before you copy it, changing the relative references to absolute ones. For example, suppose that cell C3 of a worksheet contains the formula +A1+B2, which adds the values in cells A1 and B2. If you want cell H20 to contain a formula that sums the values in those same cells, you could move the cell pointer to cell C3, press the EDIT key to bring the formula +A1+B2 to the Edit line, change the formula to +\$A\$1+\$B\$2, and press Return to enter the formula

	A	B	C	D
1			Running	Column C
2	Month	Sales	Totals	Formulas
3	-----	-----	-----	-----
4	January	\$31,216	\$31,216	@SUM(\$B\$4..B4)
5	February	\$35,372	\$66,588	@SUM(\$B\$4..B5)
6	March	\$77,839	\$144,427	@SUM(\$B\$4..B6)
7	April	\$95,567	\$239,994	@SUM(\$B\$4..B7)
8	May	\$82,684	\$322,678	@SUM(\$B\$4..B8)
9	June	\$67,835	\$390,513	@SUM(\$B\$4..B9)
10	July	\$43,904	\$434,417	@SUM(\$B\$4..B10)
11	August	\$38,136	\$472,553	@SUM(\$B\$4..B11)
12	August	\$38,136	\$510,689	@SUM(\$B\$4..B12)
13	September	\$71,547	\$582,236	@SUM(\$B\$4..B13)
14	October	\$84,031	\$666,267	@SUM(\$B\$4..B14)
15	November	\$66,459	\$732,726	@SUM(\$B\$4..B15)
16	December	\$95,706	\$828,432	@SUM(\$B\$4..B16)
17				
18	Total	\$828,432	\$828,432	+C16
19		=====	=====	

You could calculate the running totals of the values in the shaded area by using formulas in column C that add contiguous cells in column B. When the duplicate entry in row 11 is deleted, however, such formulas return errors. A better solution is to enter the formula @SUM(\$B\$4..B4) in cell C4. Copy this formula down column C, and accurate running totals result. In addition, you can delete rows from the worksheet without creating errors.

Here are tools
to help you save time, memory, and keystrokes
on routine worksheet tasks.



The period key moves the cursor from corner to corner in a highlighted range.

into the worksheet. Then you could use the Copy command to copy the formula to cell H20.

Here's a quicker way. Instead of changing the relative references in the formula into absolute ones, convert the formula into a label before you copy it. Move the cell pointer to the cell that contains the formula you want to copy, press the EDIT key and then the Home key, type a label prefix, and then press Return. Now use the Copy command to copy the resulting label to the destination cell. When you've completed copying, convert the label to a formula by removing the label prefix.

How about the opposite case, when you want 1-2-3 or *Symphony* to adjust absolute references in a formula when you copy it? You can edit the formula before you copy it, converting the absolute references into relative ones.

There is an easier way to copy formulas using an absolute reference as a relative one, however. If you use the File Xtract and File Combine commands, both relative and absolute references in the copied formula are adjusted in relation to the destination cell. For example, to copy the formula $+ \$A\$1 + \$B\$2$ as a relative reference from cell C3 of a worksheet into cell H20, move the cell pointer to cell C3, press slash (in *Symphony*, SERVICES) and select File Xtract Formulas, type the name *temp*, and press Return twice. Next place the cell pointer on cell H20, select /File Combine Copy Entire-File (in *Symphony*, SERVICES File Combine Copy Entire-File Ignore Formulas), type *temp*, and press Return. The formula $+ \$F\$18 + \$G\$19$ appears in cell H20.

3. Use the Data Fill command to create a series of values.

When you create a series of values, you might do it this way: Enter the beginning value of the series into the first cell of the range you want to fill. Enter into the second cell of the range a relative formula that calculates the second value in the series, based on the first value. Copy the formula into the remaining cells of the range. Finally, use the Range Value command to change the formulas to values (this command is not available in 1-2-3 Release 1A).

A much better way is to use the Data Fill (in *Symphony*, Range Fill) command. When you use this command, you are prompted for four pieces of information: the range to fill, the start value, the step value, and the stop value. When you supply this information and press Return, 1-2-3 and *Symphony* fill the range you specified.

For example, to enter the series 1, 3, 5, 7, 9, and 11 into range A1..A6 of a worksheet, select /Data Fill (in *Symphony*, MENU Range Fill), and indicate range A1..A6. When prompted, type 1 (the start value), press Return, type 2 (the step value), press Return, type a value greater than or equal to 11, and press Return. You can also accept

the default stop value of 8191 (2047 in 1-2-3 Release 1A). Range A1..A6 fills with odd-numbered values from 1 to 11. If you like, you can also use formulas to calculate start, step, and stop values.

4. Use the NAME key when moving or copying ranges.

To move or copy ranges, you could use the Move or Copy command, either highlighting the range or, if it is a named range, typing the name, pressing Return, specifying a destination, and again pressing Return. Highlighting a range is time-consuming, however, and typing a range name introduces the possibility of error.

If the range is named, you have a more straightforward option. You can specify it as the source or destination of a Move or Copy command. After you issue the Move or Copy command, press the NAME key (in *Symphony*, the MENU key). When you do this, the control panel in 1-2-3 Release 2/2.01 and *Symphony* will display in alphabetical order the first five range names used in the worksheet. Press NAME (in *Symphony*, MENU) again, and the list expands to full-screen size. You can view up to 105 names at a time (on one screen). To select the Source or Destination range, highlight its name and press Return. This technique is handy for other Range commands as well, including Format, Label, Erase, Justify, Protect, Unprotect, Input, Value, and Transpose.

5. Use the ABS key to adjust cell references.

Cell references within formulas can be relative, absolute, or mixed. Relative references change when you copy a formula that contains them; absolute references do not. Mixed references with absolute column components do not change when you copy them across the worksheet. Mixed references with absolute row components do not change when you copy them down the worksheet.

When you enter or edit a formula, you can make references absolute or mixed by typing dollar signs in the appropriate places. For example, to enter the formula $+ \$A1 + 1$, you could type those six characters and then press Return. To change that formula to $+ A\$1 + 1$, you could move the cell pointer to the cell that contains the original formula, then edit that formula.

If you use 1-2-3 Release 2/2.01, try this simpler alternative to change mixed and absolute references when you enter or edit a formula. Place the cell pointer on the cell containing the formula you want to edit, press EDIT to place 1-2-3 in the Edit mode, and position the cursor on or immediately to the right of a cell reference on the Edit line. Now press the ABS key. If the cell reference is $\$A1$, it becomes A1. If you press ABS again, the cell reference becomes $\$A\$1$. A third press produces the final alternative, A\$1. Note that in 1-2-3 Release 1A and in *Symphony*,

Use File Xtract and File Combine to copy absolute references relatively.

the ABS key works only in Point mode. For example, to enter the formula $+A\$1+1$, type a plus sign, then use the arrow keys to point to cell A1, press the ABS key twice, then type $+1$ and press Return.

You can also use the ABS key in 1-2-3 Release 2/01 when you write the formula. For example, to enter the formula $+A\$1+1$, type $+A1$, press the ABS key three times, type $+1$, and press Return. After you enter this formula, you can convert it to $+A\$1+1$ simply by pressing EDIT, LeftArrow twice, ABS three times, and Return.

6. Use the period key to expand and contract ranges.

After you've specified a range, you may want to expand or contract it. In most cases, you expand or contract a range from either its right or its bottom edge by using the cursor-movement keys. For example, suppose that range C3..E5 is named *test*. To alter that range to encompass C3..F6, you would press slash (in *Symphony*, MENU) and select Range Name Create, select *test* from the list of range names presented, then press RightArrow, DownArrow, and Return.

But what if you need to expand or contract a range from its left or top edge? For example, you might want to apply the name *test* to range B2..F6. You don't have to redefine an existing range when you want to expand it from either its left or its top edge. Use the period key to move the cursor to a different corner of the range. Then use the cursor-movement keys to expand or contract the range. For example, to apply the name *test* to range B2..F6 instead of to range C3..F6, press slash (in *Symphony*, MENU) and select Range Name Create, select *test*, press the period key twice, then press UpArrow, LeftArrow, and Return.

Here's how that works: Whenever you issue a command that causes 1-2-3 or *Symphony* to highlight a range, the cell in the lower-right corner of that range is marked by a small blinking cursor. That cursor marks the "free cell." If you press a cursor-movement key while a range is highlighted, 1-2-3 or *Symphony* expands or contracts the range from the sides adjacent to the free cell.

In most situations, pressing the period key moves the cursor clockwise to the next corner of the range. In some instances, the cursor moves counterclockwise. In any case, pressing the period key twice makes the cell at the upper-left corner of the range the free cell. Pressing UpArrow at this point expands the range upward from its top edge. Pressing DownArrow contracts the range from that edge. Similarly, pressing LeftArrow expands the range from its left edge, and pressing RightArrow contracts the range from that edge.

Note that when the blinking cursor is moved to the left edge of a range, the two cell designations that define the

range exchange positions. For example, A1..D5 becomes D5..A1. Once a range is specified, the positions revert to normal.

7. Calculate formulas selectively by editing or copying.

With recalculation set to Manual, you sometimes need to recalculate only one or two of the formulas in a large spreadsheet. To do this, you might press the CALC key. However, this forces 1-2-3 or *Symphony* to recalculate every formula in the worksheet—not just the ones you want. Depending on the size of the worksheet and the number of formulas it contains, calculation may take a long time.

There are two alternative ways to recalculate a formula selectively. First, you can move the cell pointer to the cell that contains the formula, press EDIT to bring the formula to the Edit line, and then press Return to enter it into the worksheet. When 1-2-3 or *Symphony* reenters the formula, it recalculates the formula. As an alternative, you can copy the formula on top of itself. To do this, simply move the cell pointer to the cell that contains the formula you want to recalculate, press slash (in *Symphony*, MENU), select Copy, and then press Return twice. 1-2-3 and *Symphony* will replace the formula with an exact copy of that formula, recalculating it in the process. This second method is particularly useful because you can use it to recalculate a group of formulas in a range of contiguous cells.

8. Set label alignment with the Range Label command.

A label's prefix controls its alignment. If a label is preceded by an apostrophe, it is left-aligned. If it is preceded by quotation marks, it is right-aligned, and if preceded by a caret (^), it is centered. To alter the alignment of a label once you have entered it, you can move the cell pointer to the cell that contains the label and edit the label prefix. You could also use the Range Label command.

When you issue this command, you get three alignment options: Left, Right, and Center. When you select one of these, you are prompted for the cell or range whose alignment you want to alter. After you specify a cell or range and press Return, all labels in the cells you specified are realigned. This is a great time saver when you must change the alignment of labels in large cell ranges.

For example, to right-align labels in range A1..L1, select /Range Label (in *Symphony*, MENU Range Label-Alignment), select Right, highlight range A1..L1, and press Return. All the labels in the range automatically become right-aligned. ■

Douglas Cobb is the author of Douglas Cobb's 1-2-3 Handbook, published by Bantam Computer Books. Steven Cobb is editor in chief of The 1-2-3 User's Journal.

A free look in



Personal computing is going through a profound change.

And that calls for an immediate decision.

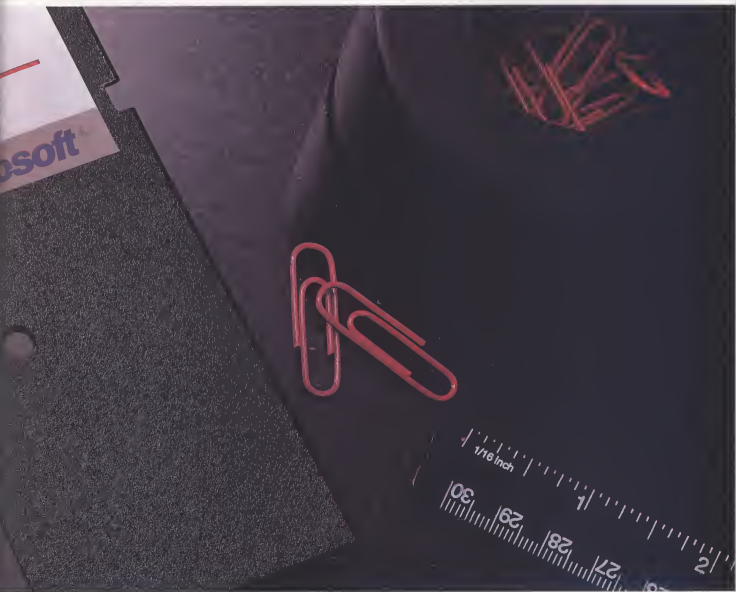
Should you stay on the path of Lotus® 1-2-3®, the traditional leader in character-based spreadsheets? Or should you turn to Microsoft® Excel for Windows, the emerging stan-

dard for graphical environments?

To find the answer, you'd probably like to make a comparison—without having to make a commitment. Which is why we made the Working Model of Microsoft Excel fully functional, but absolutely free.

Like the full-length version, it actually reads and writes 1-2-3 files. So you can use your very own worksheets while you discover the time-saving power of intelligent

to the future.



recalculation. And the simplicity of multiple, linkable worksheets. And the beauty of customized graphs and charts.

Not to mention the satisfaction of true, complete WYSIWYG and Print Preview.

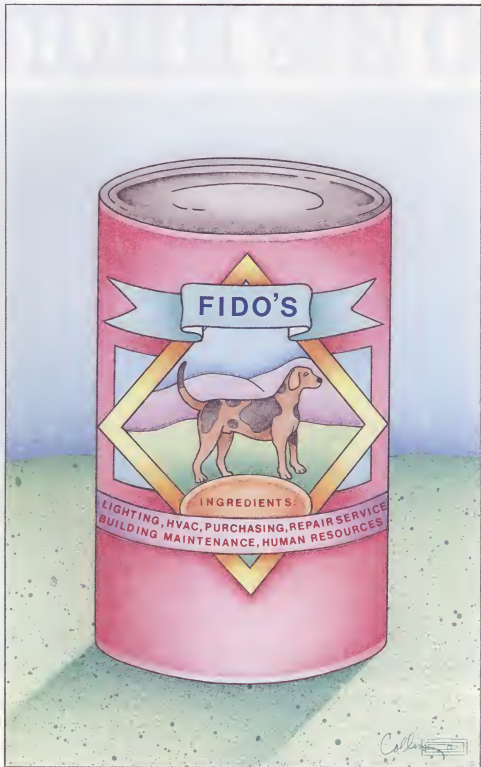
All of which is likely to reinspire that thrill you felt on the very first day you discovered electronic spreadsheets.

But back to the future. Call us at (800) 541-1261, Dept. J64, for your free Working

Model of Microsoft Excel. We predict it'll make choosing between character-based and graphics-based spreadsheets a good deal easier. However, if you're still trying to decide between the two, just bear in mind what attracted you to personal computing in the first place. Vision.

Microsoft
Making it all make sense.

Two ways
to assign
indirect
costs to
your firm's
product
lines



H

ow to divvy up overhead allocations

A basic tenet of accounting for a manufacturing operation is that the manufacturer must know the precise cost of making its product. Without this knowledge, the company cannot determine the best price for the product, record inventories correctly, or meet tax and accounting requirements.

We often associate the cost of producing goods with the costs of raw materials, labor, machinery, and so forth. However, you must also consider overhead costs, such as the lighting, temperature, and air quality of the plant, as well as salaries of administrative personnel. For the simplest manufacturing operations—those that make just one product and sell it to a distributor—virtually every cost incurred is part of the cost of making that item. Most manufacturing operations, however, produce several items. In such an environment, you must distribute overhead costs among the various products.

The simplest way to calculate overhead allocations is to assume that nonproduction departments support production departments and to divide their costs among the production cost centers. This is called the direct method. However, it's more accurate to recognize that the support cost centers also support each other. To take this fact into account with the best possible accuracy requires matrix algebra. We won't explore that method in this article, but if you're interested, you may find an explanation in an advanced cost-accounting textbook. Instead, we'll look at a simpler approach called the step method, which produces useably accurate results.

It's not necessary to create the spreadsheets before reading the descriptions of the two techniques that follow. However, you'll find complete instructions in the setup box on page 57.

Let's say that you're the controller for Fido's Favorite Pet Foods Corp. To help monitor costs and to make better pricing decisions, you must determine exactly how much it costs to manufacture the various pet foods. You already

know the direct costs, so now you must decide how to spread the costs of the Purchasing, Repair Services, Building Maintenance, and Human Resources departments among the firm's four production divisions.

Whichever allocation method you use, you must first decide what constitutes "usage" of a support department and then collect appropriate data. Start with the previous fiscal year's costs of operating the support departments, shown in column B of figure 1. Cell B8, for example, shows that the Purchasing Department had total expenditures of \$25,000 last year. You must distribute this cost among the production cost centers, based on how much each cost center used Purchasing's services.

How you measure usage of a support department is up to you. One possible route is to say that use of Purchasing is indicated by the number of purchase requisitions generated by a production division. As you can tell from range C14..C17 of figure 1, the Canned Cat Foods Division generated 3,300 requisitions, the Canned Dog Foods Division generated 2,700 requisitions, and so on.

Similarly, we've decided that use of the Repair Services Department is determined by repair orders, use of the Building Maintenance Department is determined by the number of square feet a production area occupies, and use of the Human Resources Department is determined by the number of employees in a production department. The four sets of data have been entered in columns C, D, E, and F. Note that these columns also show the usage of support departments by other support departments (in rows 8 through 11). These numbers are used in the step method but not in the direct method.

Once you've identified and collected the appropriate usage data, you're ready to calculate allocations.

THE DIRECT METHOD

Figure 2 shows overhead allocations for the production divisions according to the direct method. Range B26..B29, for example, shows how the \$25,000 cost of operating the Purchasing Department is distributed among the various

	A	B	C	D	E	F	G	H
1	OVERHEAD ALLOCATION WORKSHEET							
2	FACTORY STATISTICS							
3		Total	Purch	Repair	Sq	Number		
4		Costs	Reqs	Orders	Feet	Employees		
5								
6								
7	SUPPORT DEPARTMENTS							
8	Purchasing	\$25,000	200	100	400	1		
9	Repair Services	\$40,000	300	150	450	3		
10	Building Maint	\$55,000	255	500	500	3		
11	Human Resources	\$70,000	270	110	1,000	3		
12								
13	PRODUCTION DIVISIONS							
14	Canned Cat Foods		3,300	1,100	40,000	24	Costs of operating support departments	
15	Canned Dog Foods		2,700	1,100	39,500	25		
16	Dry Cat Foods		4,100	1,100	32,000	25		
17	Dry Dog Foods		4,200	2,300	30,000	26		
18								
19		\$190,000						

FIGURE 1. This is the upper half of both the direct-method and the step-method worksheets. All the values except for cell B19 are entered directly. Column B contains the costs of operating the support departments. Columns C through F show the usage of support departments by other support departments and by production divisions. How you measure usage of support departments in your own company is up to you. We've used numbers of purchase requisitions to measure use of the Purchasing Department, numbers of repair orders to measure use of Repair Services, square footage of department space to measure use of Building Maintenance, and numbers of employees to measure use of Human Resources.

	A	B	C	D	E	F	G	H	I	J	K	L
21	OVERHEAD ALLOCATIONS TO PRODUCTION DIVISIONS - DIRECT METHOD											
22												
23												
24			Repair	Bldg	Human	Total						
25		Purch	Services	Maint	Resrcs	Alloc'd						
26	Canned Cat Foods	\$5,769	\$7,857	\$15,548	\$16,800	\$45,974						
27	Canned Dog Foods	\$4,720	\$7,857	\$15,353	\$17,500	\$45,431						
28	Dry Cat Foods	\$7,168	\$7,857	\$12,438	\$17,500	\$44,963						
29	Dry Dog Foods	\$7,343	\$16,429	\$11,661	\$18,200	\$53,632						
30												
31		\$25,000	\$40,000	\$55,000	\$70,000	\$190,000						These values match the <i>Total Costs</i> column in figure 1.

FIGURE 2. The lower half of the direct-method worksheet allocates the costs of operating support departments to the production divisions without regard to support departments' use of each other's services. The formulas

in range B26..B29, for example, take the percentages of purchase requisitions generated by the production divisions and multiply them by the total cost of operating the Purchasing Department.

product lines. Each formula in this range starts by dividing the number of purchase requisitions for its division by the number of requisitions generated by all production divisions. The result is the percentage of the requisitions for the division. This percentage is then multiplied by the value in cell B8, the cost of operating the Purchasing Department.

Use the values in row 31 to confirm that the formulas have been entered and copied correctly. The formula in cell B31, for example, sums the four Purchasing values and returns \$25,000, which is also the amount in cell B8. This tells you that the entire cost of operating the Purchasing Department has been allocated to the production divisions.

The direct method assumes that the services that support departments provide each other are immaterial in decisions based on production costing. The data in figure 1 shows that use of support departments by each other is, indeed, small compared with use of support departments by production divisions. Still, it is more accurate to take these numbers into account. You can accomplish this by calculating overhead allocations with a slightly different approach.

THE STEP METHOD

To account for the fact that support departments also use each other's services, the step method adjusts operating costs upward. These higher values are divided among the production divisions. The support department that uses the most other support has its total cost increased the most. The total for the support department that uses the least other support is not adjusted at all. This is why the technique is called the step method: The overhead allocations are passed from one department to the next in a series of steps.

To use this method, you must arrange the support departments in ascending order of other-department usage. We've done this in figure 1. Note that Purchasing has the fewest employees, generates the fewest repair orders, and has the smallest amount of floor space. Repair Services is second. Although it generates the most purchase orders among the support departments, it has the second smallest floor space and is far behind Building Maintenance in repair orders.

You can see in figure 3 that the cost of operating Repair Services, cell B27, is adjusted by its allocation of Purchasing overhead. The cost of operating Building Maintenance

	A	B	C	D	E	F	G	H	I	J	K	L
21	OVERHEAD ALLOCATIONS TO PRODUCTION DIVISIONS - STEP METHOD											
22												
23		Adjusted	Repair	Bldg	Human	Total						
24		Costs	Purch	Services	Maint	Resrcs	Alloc'd					
25												
26	Purchasing	\$25,000										Support-department costs adjusted to account for use by other support departments
27	Repair Services	\$40,496	\$496									
28	Building Maint	\$58,682	\$421	\$3,261								
29	Human Resources	\$71,575	\$446	\$717	\$412							
30												
31	Canned Cat Foods		\$5,455	\$7,173	\$16,472	\$17,178	\$46,278					
32	Canned Dog Foods		\$4,463	\$7,173	\$16,266	\$17,894	\$45,796					
33	Dry Cat Foods		\$6,777	\$7,173	\$13,178	\$17,894	\$45,022					
34	Dry Dog Foods		\$6,942	\$14,998	\$12,354	\$18,610	\$52,904					
35												
36	Check Sums		\$25,000	\$40,496	\$58,682	\$71,575	\$190,000					These values match the <i>Adjusted Costs</i> column.

FIGURE 3. The step method of overhead allocation allows for usage of support departments by other support departments. It requires that you arrange the support departments in ascending order of their usage of

other support departments. The allocations are added to the costs of subsequent departments. These adjusted cost amounts are used in the formulas that compute allocations for production divisions.

nance, cell B28, is adjusted by its allocations of Purchasing and Repair Services, and so forth. These numbers don't have any meaning themselves; they are just a step in the process.

The formulas for overhead allocations for production divisions, range C31..F34, are similar to the corresponding formulas in the direct-method worksheet: Each one multiplies the percentage of a support department's services used by a production division by the total cost of the support department. There are two differences, however.

First, the percentage is computed by dividing the production division's usage value (requisitions generated, square footage, and so on) by the sum of usage values from all cost centers except the support department being allocated and the support departments that come before it in the order described earlier. For example, the formula in cell C31 (Purchasing allocations for the Canned Cat Foods Division) divides the value in cell C14 (requisitions generated by Canned Cat Foods) by the number of requisitions generated by all departments except Purchasing. The formula in cell D31 (Repair Services allocations for Canned Cat Foods) divides cell D14 (re-

pair orders from Canned Cat Foods) by the number of repair orders from all cost centers except Purchasing and Repair Services.

Second, the values that are multiplied by these percentages are the adjusted total costs from range B26..B29 rather than the real operating costs in range B8..B11.

Notice that the results of the formulas in range C36..F36 match the results in range B26..B29. Remember, these numbers have no significance other than for checking the validity of the formulas. For example, you obviously haven't allocated \$40,496 for Repair Services, since the total cost of Repair Services is only \$40,000.

The values displayed in range G31..G34, however, are accurate. Total overhead cost for the Canned Cat Foods Division is \$46,278, overhead for the Canned Dog Foods Division is \$45,796, and so on. The four *Total Alloc'd* column values add up to \$190,000, as do the actual support department costs (cell B19 in figure 1). You should use this result as a second check of the validity of your formulas. ■

Stephen L. Nelson, CPA, is a consultant in Redmond, Wash., and author of Using DacEasy Accounting (Que Corp., 1988).

HOW TO SET UP THE WORKSHEETS

WORKSHEET 1—The direct method

1. Global settings

Recalculation: Manual

I-2-3: /Worksheet Global Recalculation Manual

Symb: MENU Settings Recalculation Method Manual Quit

Format: Currency, 0

I-2-3: /Worksheet Global Format Currency, enter 0

Symb: MENU Settings Format Currency, enter 0, select Quit

2. Individual column widths

Column Width
A 18

Position the cell pointer in column A and select

I-2-3: /Worksheet Column Set-Width, enter 18

Symb: MENU Width Set, enter 18

3. Cell formats

Format Range
0 C8..F17
(**Symb:** Punctuated 0)

I-2-3: /Range Format, type a comma, enter 0, indicate range C8..F17

Symb: MENU Format Punctuated, enter 0, indicate range C8..F17

4. Labels

Enter all the labels shown in figures 1 and 2. To create dividing lines, enter \-. Right-align the labels in ranges B4..F5 and B23..F24: Select /Range Label Right (**Symb:** MENU Range Label-Alignment Right) and indicate the appropriate range.

5. Values

Enter all the values shown in range B8..F17 in figure 1.

6. Enter and copy formulas

Cell Formula

B19 @SUM(B6..B18)

B26 +C14/@SUM(C314..C317)+B58

C26 +D14/@SUM(D314..D317)+B59

D26 +E14/@SUM(E314..E317)+B510

E26 +F14/@SUM(F314..F317)+B511

F26 @SUM(B26..E26)

Copy range B26..F26 to range B27..B29.

B31 @SUM(B25..B30)

Copy cell B31 to range C31..F31. Save the worksheet under the name DIRECT.

WORKSHEET 2—The step method

Erase range A21..F31.

1. Labels

Enter the labels shown in figure 3, and right-align the labels in range B23..G24.

2. Enter and copy formulas

Cell Formula

B26 @SUM(B8..C26..F26)

Copy cell B26 to range B27..B29.

These formulas do not initially return the values shown.

C27 +B526+(C9/@SUM(C59..C317))

Copy cell C27 to range C28..C29.

D28 +B527+(D10/@SUM(D510..D317))

Copy cell D28 to cell D29. Press the CALC key.

C31 +C14/@SUM(C59..C317)+B526

D31 +D14/@SUM(D510..D318)+B527

E29 +B528+(E11/@SUM(E311..E317))

E31 +E14/@SUM(E311..E317)+B528

F31 +F14/@SUM(F314..F317)+B529

G31 @SUM(B31..F31)

Copy range C31..G31 to range C32..C34.

C36 @SUM(C25..C35)

Copy cell C36 to range D36..G36. Save the worksheet under the name STEP.

SPREADSHEET CHALLENGE

This is a twist. Although the pages of LOTUS usually provide solutions, not problems, we're about to challenge you with four business problems. But we'll also point you toward the solutions by providing clues, mainly in the form of @functions—@PV, @PMT, @MOD, @IF, @DATE, @SUM, and @TERM. If you are unfamiliar with these functions, you'll learn about them when you check your solutions against ours.

Should you refinance a loan?



PROBLEM One year ago your company took out a loan for \$100,000 to purchase an industrial-capacity laser printer. The terms were four years at a 13% annual interest rate. You have already made 12 monthly payments at \$2,682.75.

Another bank will refinance the loan at 12%. But it wants to add 2% to the outstanding principal, and it re-

quires that you repay the loan within three years. Is this a good deal?

TOOLS @PV, @PMT

SOLUTION As you can see, the top half of this figure analyzes the current loan; the bottom half analyzes the results of refinancing. Let's focus on the original-loan analysis for now.

	A	B	C	D	E
1	Original Loan				
2	-----				
3	Total Loan Amount			\$100,000.00	
4	Annual Rate			13%	
5	Term (Months)			48	
6	Monthly Payment			\$2,682.75	
7	Total Cost to Repay Loan			\$96,578.99	
8					
9	Refinanced Loan				
10	-----				
11	Remaining Principal Owed			\$79,621.10	
12	Total Loan Amount			\$81,213.52	
13	Annual Rate			12%	
14					
15		Monthly	Total	Total	
16	Term	Payment	Paid	Savings	
17	12	\$7,215.72	\$86,588.68	\$9,990.31	
18	18	\$4,952.57	\$89,146.21	\$7,432.78	
19	24	\$3,823.00	\$91,752.06	\$4,826.92	
20	30	\$3,146.87	\$94,406.12	\$2,172.86	
21	36	\$2,697.45	\$97,108.24	(\$529.26)	

First determine the total cost of repaying the original loan. You already know that your monthly payment is \$2,682.75. To derive that figure, use the @PMT function, which requires three arguments: the principal, the periodic interest rate, and the term. The model shows these values entered into separate cells in range D3..D5. Cell D6 contains the formula @PMT(D3,D4/12,D5). Since

you're solving for a monthly payment, the formula divides the annual interest rate, in cell D4, by 12 to obtain the monthly interest rate.

Once you derive the monthly payment, it's easy to figure out the total cost to repay the loan, shown in cell D7. Simply multiply 36, the number of remaining payments, by the monthly payment. Cell D7 contains the formula $+D6*36$, which calculates that over the next three years you'll pay \$96,578.99 to pay off the loan. This number is important; you'll soon compare it with the cost of refinancing.

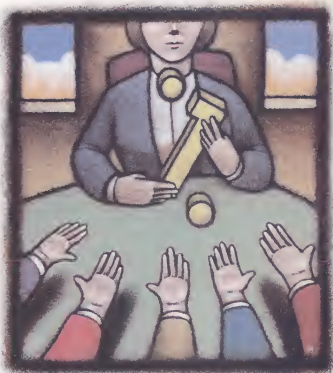
Now calculate what it will cost to repay the loan if you refinance. You can begin by using the @PV function to calculate the remaining principal that you owe on the original loan. Like @PMT, this function requires three arguments: the periodic payment, the periodic interest rate, and the term. Since you're using a monthly payment and specifying the term in months, divide the annual interest rate by 12. Cell D11 contains the formula $@PV(D6,D4/12,36)$, which calculates that you owe \$79,621.10 in principal.

This @PV calculation is necessary because the refinancing offer requires that you add 2% to the outstanding principal. Cell D12 of the figure contains the formula $+D11*1.02$, which calculates the refinanced principal as \$81,213.52.

With this information entered in the model, along with the refinanced loan's interest rate in cell D13, you can set up a table like the one that is shown in range A15..D21. Column A of the table contains various terms, expressed in months. Cell B17 of the figure contains the formula $@PMT(D$12,D$13/12,A17)$, which calculates the monthly payment on the refinanced loan. Cell C17 contains the formula $+A17*B17$, which calculates the total amount you will repay if you refinance. Finally, cell D17 contains the formula $+D$7-C17$, which evaluates how much you save by refinancing. After entering these three formulas, you copy range B17..D17 down the columns.

Given the results shown in the table, you shouldn't refinance the loan for a 36-month term because you'll wind up paying an extra \$529.26. Barring other factors, such as tax considerations and alternative investment options, refinancing is cost-effective only if your company can afford higher monthly payments over 30 months or fewer.

How do you keep totals to a certain percent?



PROBLEM You must assign an annual increase to each of your direct reports. The increase in total salaries cannot exceed 6% of their current total. Build a worksheet that lets you change the percent increase for one employee and automatically recalculates the total percent.

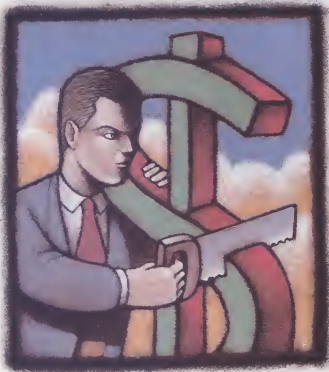
TOOLS @SUM

SOLUTION This problem proves that the simple solution is sometimes the best solution. Column A in the figure

	A	B	C	D	E	F
1		Current	Percent	New		
2	Employee	Salary	Increase	Salary		
3						
4	Bater, Peg	25,000.00	7.00%	26,750.00		
5	Fox, Steve	32,400.00	6.50%	34,506.00		
6	Morris, Jane	40,000.00	5.00%	42,000.00		
7	Smith, Ann	17,500.00	5.50%	18,462.50		
8	Winston, Jim	16,260.00	6.50%	17,316.90		
9						
10	Total Increase		6.00%			

ure contains the employees' names. Column B contains their current salaries. Range C4..C8 contains the percent increases that you are proposing. Cell D4 contains the formula $+B4*(1+C4)$, which multiplies the current salary of each of your employees by the percent increase to determine the new salary. You copy this formula down the column. Finally, cell C10 contains the formula $@SUM(D4..D8)/@SUM(B4..B8)-1$, which determines the percent increase. It does this by comparing the sum of the current salaries with the sum of the new salaries.

How do you calculate discounts?



PROBLEM You need an accounts receivable worksheet that calculates customer discounts and payment due dates. For orders of \$300 or more, you give a 10% volume discount. In addition, for payments received within 10 business days of the invoice date, you give a 5% discount on the net order—that is, the total order minus the volume discount, if one applies.

Build a model that handles both discount situations and adjusts the early payment date so that if it normally falls on a Saturday or Sunday, the worksheet shows a due date of the following Monday. In your solution, use the sample data in columns A through C of the figure at the bottom of the page.

TOOLS @IF, @MOD, @DATE

SOLUTION Columns A and B contain customer names and order amounts. Column C holds the invoice dates, which you enter as @DATE formulas. The @DATE function requires three arguments: year, month, day. For example, the formula in cell C4 is @DATE(89,5,3). Once you enter the formula in cell C4, the serial value of the date appears. It's important to use serial date values in the solution because the model needs to calculate payment dates, which are based on the original invoice date. To display the dates as shown in the figure at the bottom of the page, use the Date 1 format.

To calculate the volume discount in column D, use an @IF formula that says "If the total order is greater than or equal to 300, calculate 10% of the total order. Otherwise, enter 0." The formula in cell D4 of the figure is $@IF(B4 >= 300, B4 * 0.1, 0)$.

Use simple math to calculate the payment due. The formula in cell E4 is $+B4 - D4$.

The calculation of the early due date, in column F, is complex. The formula will add 10 days to the invoice date and then determine whether that date is a Saturday or Sunday. If it is, the formula calculates the following Monday's date.

To test what day of the week a serial date falls on, use the @MOD function. Using the two arguments that you supply, the dividend and the divisor, this function performs simple division and returns a remainder. Here you use the invoice date plus 10 as the dividend and 7 as the divisor. In this case, the calculated results range from 0 to 6. A 0 indicates that the day falls on a Saturday, 1 indicates a Sunday, and so on. Based on the remainder returned, the formula determines the day of the week.

Look at the formula that does the job:

$@IF(@MOD(C4 + 10, 7) = 0, C4 + 12,$
 $@IF(@MOD(C4 + 10, 7) = 1,$
 $C4 + 11, C4 + 10))$

The formula says: If the invoice date plus 10 is a Saturday, return the invoice date plus 12; if the invoice date plus 10 is a Sunday, return the invoice date plus 11; other-

	A	B	C	D	E	F	G	H	I	J	K
1	Customer	Total Order	Invoice Date	Volume Discount Due	Payment Due	Early Due Date	Early Discount	Early Amount Due			
2											
3											
4	L&A Plumbing	1005.98	03-May-89	100.60	905.38	15-May-89	45.27	860.11			
5	Jex Inc.	256.38	09-May-89	0.00	256.38	19-May-89	12.82	243.56			
6	Barrett's	342.10	10-May-89	34.21	307.89	22-May-89	15.39	292.50			
7	Grant Bros.	865.81	11-May-89	86.58	779.23	22-May-89	38.96	740.27			

wise, return the invoice date plus 10.

Calculating the early discount and early amount due is a snap. The formula in cell G4 is $+E4*0.05$, while the formula in cell H4 is $+E4-G4$.

Finally, copy range D4..H4 down the columns as necessary.

How do you create a savings schedule?



PROBLEM As representative for a local bank, you give customers advice on saving for a down payment on a house. Customers often ask how much money they need to stash away each month and roughly how long it will take to amass a certain down payment.

Build a table that uses the current interest rate and calculates different combinations of monthly contributions, total savings amounts, and terms. In addition, the table should allow you to change the annual interest rate and recalculate the results quickly.

TOOLS @TERM, two-way data table (in *Symphony*, what-if table)

This method doesn't work in 1-2-3 Release 1A and *Symphony* Release 1/1.01 because they lack the @TERM function.

SOLUTION To build the table, use an @TERM calculation in a two-way data table. The @TERM function returns the number of payment periods necessary to accumulate a future value earning a specified interest rate. This function requires three arguments: the periodic payment, the

periodic interest rate, and the future value. Let's assume that the current interest rate is 7%. The two arguments that will vary are the periodic payment and the future value.

	A	B	C	D	E	F
1	Annual Interest Rate			7.00%		
2	Monthly Payment					
3	Future Value					
4						
5	ERR	\$5,000	\$10,000	\$15,000	\$20,000	
6		\$100	44	79	108	133
7		\$200	23	44	62	79
8		\$300	16	31	44	56
9		\$400	12	23	34	44
10		\$500	10	19	28	36

The Data Table 2 command produces a table showing the different values a formula generates each time you change two values in it. The figure shows the completed data table. Cell D1 holds the current interest rate, 7%. Cells D2 and D3, input cells 1 and 2, respectively, represent the two changing values in the @TERM formula that the data table will calculate. In column A we've entered labels that identify the input cells in column D.

Cell A5 contains the formula @TERM(D2,D1/12,D3). Since you're using a monthly payment, you must divide the annual interest rate by 12. The data table substitutes values that you supply into cells D2 and D3 and calculates the results. Note that the formula returns ERR when you enter it.

Range A6..A10 contains the first set of values. These values are substituted, one at a time, into input cell 1 in the formula. Range B5..E5 contains future values. These values are substituted, one at a time, into input cell 2 in the formula.

After entering the formula in cell A5 and the data in ranges A6..A10 and B5..E5, select /Data Table 2 (in *Symphony*, MENU Range What-If 2-Way). Enter the Table range as A5..E10. Specify cell D2 as input cell 1. Specify cell D3 as input cell 2. The table automatically fills with values representing roughly the number of payments necessary to reach a certain down payment.

Note that some of the results in the table may be one payment short. To double-check this, use the @FV function, which requires three arguments: the periodic payment, the periodic interest rate, and the term. For example, to double-check that it will take 31 payments of \$300 to accumulate \$10,000, use the formula @FV(300,07/12,31). The calculated result is \$10,161.57.

To recalculate the table using a different interest rate, you simply have to enter the new rate in cell D1 and then press the TABLE key in 1-2-3. In *Symphony* select MENU Range What-If 2-Way and then press Return three times. ■

Paula Dempsey is a documentation manager at Lotus Development Corp.

The new COMPAQ DESKPRO 286e.
Further proof that what's on the outside,



says a lot about what's on the inside.

Compaq has earned a reputation for building the most powerful and reliable personal computers in the world.

In doing this, we've always given users the best combination of features needed to do their jobs. We've also never given up the belief that even the most basic needs deserve more than just basic solutions.

As further proof, we offer the COMPAQ DESKPRO 286e Personal Computer.

It brings together a 12-MHz 286 microprocessor and a long list of integrated features. All in a compact package that runs the latest applications, without



Five expansion slots give you room to grow: one for high-speed memory, and four for thousands of industry-standard add-ins.

taking up more desk space.

Your users will find everything they need in a stand-alone

PC, perfect for their growing business productivity applications.

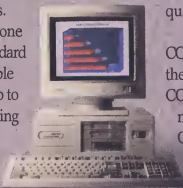
You'll also find a PC that's been rigorously tested with a wide range of network products, so it's compatible in virtually any network environment.

Now for an inside look. High-performance VGA graphics are built right on the system board. So your users

Built-in interfaces mean you can connect a mouse, printer, modem or other tools without taking up a slot.

can have displays that are easier to read. You, in turn, will have compatibility with all your EGA- and CGA-specific software plus performance that's up to 50% faster than other VGA controllers.

In memory, one megabyte is standard and is expandable in increments up to 13 megabytes using a separate high-speed memory expansion slot.



This leaves four industry-standard expansion slots open for LAN cards, mainframe links, etc. to customize the COMPAQ DESKPRO 286e to your users' needs.

You can take customization a step further. The COMPAQ

You get the flexibility to use both 5 1/4- and 3 1/2-inch diskette drives, along with a wide variety of high-speed fixed disk drives and tape drives.



DESKPRO 286e can be configured with up to four internal storage devices. Choose fast 110-, 40- and 20-MB fixed disk drives; both 5 1/4- and 3 1/2-inch diskette drives; even tape drives.

As you can see, the new COMPAQ DESKPRO 286e offers the same attention to detail that has made the COMPAQ name unmatched for performance, quality and reliability.

For a free brochure on the COMPAQ DESKPRO 286e and the location of an Authorized COMPAQ Computer Dealer near you, call 1-800-231-0900, Operator 92. In Canada, just call 1-800-263-5868, Operator 92.

COMPAQ

It simply works better.

No Carbon Required.



Some remote control programs work only if you have their program at both ends. That way you get one remote control program for the price of two.

Not REMOTE². It comes in two modules-REMOTE² Host or REMOTE² Call. You can buy either or both. Whatever you need. You can call REMOTE² Host using REMOTE² Call, or any terminal or terminal emulator.

With REMOTE² you get all the benefits you would expect with a remote control package. What you don't get is the bill for the copy of the program you don't need.

REMOTE²

CROSSTALK COMMUNICATIONS
1000 Holcomb Woods Parkway
Roswell, Georgia 30076-2575
404/998-3988

A Division of Digital Communications Associates, Inc. ~~also~~
REMOTE² is a trademark of
Digital Communications Associates, Inc.

A FINANCIAL CALCULATOR THAT DOES IT ALL

If you decide to save \$64,000 to buy a boat, it's easy to figure out how much you must deposit each period to reach the desired amount in a given amount of time. Or, if you know how much you can afford to save, you can easily determine how long it will take. The @PMT and @TERM functions can do these jobs nicely. But using these functions is valid only if you start the boat fund from zero.

Having \$10,000 to start the fund, while being a distinct advantage, complicates matters where computing payment amounts or terms is concerned. The 1-2-3 or *Symphony* financial @functions cannot handle factors like large initial payments, balloon payments, adjustable-rate mortgages, and so forth.

You can, however, with 1-2-3 Release 2/2.01 or any release of *Symphony*, create a single-screen financial template that provides the unknown values for just about any kind of loan or annuity. Figure 1 shows a portion of such a template. You enter the known values in column B, and the formulas in column C tell you the rest.

The worksheet also contains a few macros that speed up the tasks of erasing cells, copying results, and calculating the number of periods between two calendar dates. The portion of the worksheet containing these macros is shown in figure 2.

Take a few minutes now to build the template, using the instructions in the setup box on page 67. Then we'll look at how the spreadsheet works and how to use it.

A GUIDED TOUR

First consider the formulas that you've just entered in range E2..E8, the results of which are referenced by the formulas in the *Unknown Values* column. We don't need to discuss these, except to note that the one in cell E2, working with cells E3 and E4, computes the per-period interest rate.

It's impossible to compute the interest rate of an annuity by using ordinary algebraic methods. Rather, you must devise a trial-and-error scheme that zeros in on the cor-

rect, or nearly correct, rate. We've done this by using circular references. Notice that cell E2 refers to itself and also to cell E3 and that E3 refers to cell E2. Every time the sheet is recalculated, the value in cell E3 gets closer to zero and the value in cell E2 gets closer to the true per-period interest rate. Remember, the circular references are intentional, and you should disregard the CIRC indicator that you see at the bottom of the screen.

The accuracy of the result in cell C2 is dependent on the number of times the worksheet is recalculated. Usually, five calculations are sufficient to produce an infinitesimal value in cell E3. Nevertheless, we've arranged for the spreadsheet to recalculate 10 times every time you press the CALC key. If you find that calculation takes too long with 10 iterations, try 5 iterations, but be sure to erase all the known values and press CALC every time you wish to enter a new set of known values. Otherwise, you may get inaccurate results if, for example, you evaluate an annuity with annual or semiannual payments and then evaluate one with monthly payments. The \w macro clears the column B values in one keystroke.

Now let's look at the formulas in the *Unknown Values* column. Cell C2 translates the one-letter code you enter in cell B2 into a payments-per-year value. If you enter an M (for monthly) in cell B2, for example, cell C2 returns 12. We'll look at this more closely later. Note that the remaining formulas in column C are designed to return empty strings if you enter a value in the adjacent cell in column B. If several of the column B cells are empty, some of the column C formulas may return ERR.

The formula in cell C3 returns the number of periods required to reach the specified future value. It uses the standard formula for computing the terms of an annuity with an initial payment and periodic payments:

$$\log \frac{\left(1 + fv \times \frac{\text{int}}{\text{pmt}}\right)}{1 + pv \times \frac{\text{int}}{\text{pmt}}} \div \log (1 + \text{int})$$

This unique template picks up where the @functions leave off.

	A	B	C	D
1		Known Values	Unknown Values	
2	Frequency	M	12	
3	# of Periods		86.00 Months	
4	Annual Interest Rate	8.000%		
5	Principal/PV	\$10,000.00		
6	Periodic Pmt/Dividend	(\$400.00)		
7	Term to Balloon			
8	Balloon Payment/FV	\$64,000.00		
9	Interest Paid			
10				
11	Periodic Payment (Annuity Due)			

FIGURE 1. The main section of the worksheet contains a range for entering the known values regarding an investment or loan (range B2..B9) and a range that displays the values you *don't* know (range C2..C11). Here, the spreadsheet is used to determine the number of months required to acquire \$64,000 (cell B8) after starting the fund with \$10,000 (cell B5) and adding \$400 to it each month (cell B6) with an annual interest rate of 8% (cell B4). The answer, 86 months, appears in cell C3.

	H	I	J	K	L
1	\e	/RE"			
2					
3	\c	@ROUND((RIGHT),5)(CALC)"			
4					
5	\w	{BLANK known}(CALC)			
6					
7	\d	{GETLABEL "Enter Starting Date (MM/DD/YY): ",startdate) (LET startdate,@DATEVALUE(startdate)) {GETLABEL "Enter Ending Date (MM/DD/YY): ",enddate) (LET enddate,@DATEVALUE(enddate)) (IF startdate>enddate)(errormsg){BRANCH \d) (RECALC freq) (LET periods,@ROUND((enddate-startdate)*freq/365.25,2)}"			
8					
9					
10					
11					
12					
13					
14					
15	errmsg	{BEEP 2}{BEEP 3} Ending date is before starting date (press Return) (?)(ESC)			
16					
17					
18					
19	startdate				
20	enddate				

FIGURE 2. These four macros speed up some of the tasks you need to accomplish while using the worksheet. They work in both 1-2-3 Release 2/2.01 and *Symphony*, except for the instruction in cell I1, which must be changed to {MENU}E~ for *Symphony*. The \e (erase) macro erases whatever cell the cell pointer is on. The \c (capture) macro places the value of the cell to the right of the current cell in the current cell. The cell pointer must be in column B when you use this macro. The \w (wipe) macro erases the input range (B2..B9) and recalculates the worksheet. Finally, the \d (date) macro calculates the exact number of periods when you know the starting and ending dates of an investment and places the result of the calculation in the # of Periods cell in column B.

The formula in cell C4 simply multiplies the per-period interest rate from cell E2 by the number of periods per year in the cell named *freq* (C2). This tells you the annual interest rate of your investment if that is the missing piece of the puzzle.

The formula in cell C5 returns the principal of your investment. It's based on this mathematical approach:

$$\text{payment} \times \frac{1 - (1 + \text{int})^{-\text{term}}}{\text{int}} + \text{balloon} \times (1 + \text{int})^{-\text{term}}$$

Cell C6 computes the period payment of the investment, using this approach:

$$\frac{(\text{principal} - \text{balloon} \times (1 + \text{int})^{-\text{term}}) \times \text{int}}{1 - (1 + \text{int})^{-\text{term}}}$$

Cell C8 computes the value of the balloon payment by subtracting the future value of the stream of periodic payments from the future value of the principal.

Cell C9 computes the dollar value of the interest the fund pays. The heart of the formula is the expression B6*E6-B5+B8, which multiplies the periodic payment by the number of periods, subtracts the principal, and adds the balloon payment. This expression is incorporated into an @IF function so that the formula returns a value only if (1) you enter values for the principal and the

periodic payment but not for the term to balloon or the balloon payment, or (2) you enter all four of these values. If you find that the formula gives unexpected results, recheck the formula against the one printed in the setup box, paying special attention to the parentheses.

Finally, cell C11 converts the per-period payment, if the payment is your "unknown" item, to the payment you make if the investment is the annuity-due type. It simply divides the ordinary-annuity payment amount (cell C6) by one plus the per-period interest rate.

USING THE TEMPLATE

Whenever you want to evaluate a loan, a sinking fund, a mortgage, a bond, almost any kind of annuity investment, simply enter the values you know in column B and press the CALC key. Typically, you will always make an entry in cell B2 and have only one blank cell in the range B3..B6. If the investment does not involve a balloon payment, you leave cells B7 and B8 empty.

Although you may be used to using negative numbers to indicate outgoing cash flows, in this worksheet you use only positive numbers. The one exception to this involves the *Periodic Pmt/Dividend* cell (B6). This will be explained later.

In cell B2 enter a letter to indicate the frequency with which payments are made or received: M for monthly, Q for quarterly, S for semiannually, or A for annually. If the

number of payments in a year doesn't fall into one of these categories, just enter a number in cell B2—for example, 52 or 5. After you set up the worksheet, you may wish to change the default label prefix to a quotation mark so that if you enter a letter in cell B2, it is automatically right-aligned. In 1-2-3 select /Worksheet Global Label-Prefix Right. In *Symphony* select MENU Settings Label-Prefix Right Quit.

Enter the number of periods in the annuity in cell B3. For example, for a 30-year mortgage with monthly payments, enter 360.

Enter the annual interest rate in cell B4. Be sure to enter the value either as a decimal or followed by a percent sign. For a loan with a 10.5% annual rate, for example, enter either .105 or 10.5%.

In cell B5 enter either the principal or the present value of the investment you're evaluating. This could be the amount of money you plan to borrow, the amount you

start a fund with, or the price of a bond.

In cell B6 enter the per-period payment, deposit, or dividend. If the value for the balloon payment represents a cash flow in the opposite direction from the periodic payment, as is the case with a sinking fund, you must enter the periodic payment as a negative number. The first example illustrates this.

In cell B7 enter the number of periods there are until you must make a balloon payment. This value cannot be greater than the value for the number of periods. Note that the term *balloon payment* can refer to the desired future value of a sinking fund or to the amount of money still owed when the interest rate of an adjustable-rate mortgage changes. You'll understand this better when you work through the examples. Finally, in cell B8 you enter the amount of either the balloon payment or the future value of the investment.

Now that the ground rules are in place, give the tem-

HOW TO SET UP THE WORKSHEET

1. Default settings

Recalculation: Manual, 10 iterations
1-2-3: /Worksheet Global Recalculation Manual /Worksheet Global Recalculation Iterations, enter 10

Symph: MENU Settings Recalculation Method Manual Recalculation Iterations, enter 10, select Quit

Format: Currency 2
1-2-3: /Worksheet Global Format Currency, press Return

Symph: MENU Settings Format Currency, press Return, select Quit

Column width: 16
1-2-3: /Worksheet Global Column-Width, enter 16
Symph: MENU Settings Width, enter 16, select Quit

2. Individual column widths

A 22
Place the cell pointer in column A and select
1-2-3: /Worksheet Column Set-Width, enter 22
Symph: MENU Width Set, enter 22

3. Cell formats

Format	Range
General	B2..C2
Fixed 2	B3..C3
Percent 3	B4..C4
(Symph: % 3)	
Fixed 2	B7..C7
General	E2..E8
Date 1	I20..I21

For example, to set the format for range B2..C2, select

1-2-3: /Range Format General, indicate range B2..C2
Symph: MENU Format General, indicate range B2..C2

4. Labels

Enter the labels shown in figures 1 and 2 (except for the label in cell D3). Right-align the label in cell B2. Select /Range Label Right (**Symph:** MENU Range Label-Alignment Right) and specify cell B2. In figure 2 be sure to begin labels that start with \, /, or @ with an apostrophe. In *Symphony* enter {MENU/E~ instead of the label shown in cell I1. Finally, enter the label *Formulas* in cell E1.

5. Values

Enter the values shown in column B of figure 1.

6. Range names

Use the labels in range H11..H20 to assign names to adjacent cells in column I: Press slash (**Symph:** MENU), select Range Name Labels Right, and specify range H11..H20. Then assign the following additional range names:

Name	Range
known	B2..B9
periods	B3
freq	C2

For example, to assign the name to range B2..B9, press slash (**Symph:** MENU), select Range Name Create, enter *known*, specify range B2..B9.

7. Formulas

Cell	Formula
C2	@F(@N(B2..B2)>0, B2,@F(B2="M",12,@F (B2="Q",4,@F(B2="S", 2,@F(B2="A",1,1)))
C3	@F(periods,"",@ROUND(- (@LOG((B6+(E7*B5)/ (-B6+(E7*B8)))@LOG (1+E7)),0))
C4	@F(B4,"",E2*freq)
C5	@F(B5,"",B6*(1-E8)/E7+B8+E8)
C6	@F(B6,"",B5-B8+E8)/E7*(1-E8)
C8	@F(B7,@F(B8,"",B5* (1+E7)^B7-@FV(B6,E7,B7))),
C9	@F((@COUNT(B5..B8)=4)#OR# (@COUNT(B5..B6)=2#AND# (@COUNT(B7..B8)=0), B6+E6-B5+B8,"")
C11	@F(@N(C6..C6)=0,"",C6*(1+E7))
D3	@F(@ISNUMBER(C3),@F("Months",@F(B2="M", "Half-years",@F(B2="Q", "Quarters",@F(@S(B2..B2)= "A","Years","Periods"))), "Periods"))
E2	@F(@ISERR(E2),0.004,E2-E3)
E3	(B5-E4*(1-E5)-B8+E5)/ (E6+B8+E5/(1+E2)- E4*(E6+E5/(1+E2)-(1-E5)/E2))
E4	+B6/E2
E5	(1+E2)^A-E6
E6	@F(B8,B7,periods)
E7	+B4/freq
E8	(1+E7)^A-E6

	A	B	C
1		Known Values	Unknown Values
2	Frequency	S	2
3	# of Periods	36.43	
4	Annual Interest Rate		8.713%
5	Principal/PV	\$8,450.00	
6	Periodic Pmt/Dividend	\$350.00	
7	Term to Balloon	36.43	
8	Balloon Payment/FV	\$10,000.00	
9	Interest Paid		\$14,300.50
10			
11	Periodic Payment (Annuity Due)		

FIGURE 3. Here, the spreadsheet calculates the true interest rate of a bond. This is a 7%, \$10,000 bond and therefore pays a \$350 dividend every half year. But since it also pays \$10,000 upon maturity, the true return on the investment of \$8,450 is 8.713% (cell C5).

plate a try. You've already entered the values shown in figure 1. The result in cell C3 tells you how long it will take to acquire \$64,000 if you put \$10,000 into an account paying 8% annual interest and add \$400 to the fund every month. Note that the value in cell B6 is negative. As mentioned earlier, you use a negative value here when the periodic payments flow from you to the fund, but the balloon payment flows from the fund to you. Normally, we say that the future value of the balloon is equal to the future value of the principal minus the future value of the payments. However, the logic used in this spreadsheet would *add* the future value of the payments, so you must make the payment value negative.

Figure 1 illustrates just one way in which the template is more versatile than the financial @functions alone. You couldn't get this answer with @TERM because it doesn't factor in the \$400 monthly payment. On the other hand, @CTERM doesn't factor in the effect of the initial \$10,000 payment.

Notice that if you leave out the number of periods, as in this case, the formula in cell D3 complements cell C3 with the name of the period. This formula can return the labels *Months, Quarters, Half-Years, Years, or Periods*. If you enter a number in cell B3, cell D3 is blank.

Now clear the known values by holding down the MACRO key (Alt on most computers) and pressing W, and try a second example. Suppose you want to know the true yield of a 7%, \$10,000 bond that comes due August 1, 2007, with a price today of \$8,450. Bonds usually pay interest semiannually, so enter an S in cell B2. You don't know the exact term of the bond, just two calendar dates. This is where the Δ macro comes in handy. Hold down the MACRO key and press D. You'll see the prompt *Enter Starting Date (MM/DD/YY):* on the control panel. For this exercise, enter 5/14/89. When prompted for the end date, enter 8/1/2007. The macro subtracts the starting date from the ending date, multiplies the result by the number of payment periods per year, divides that product by 365.25, and places the result in cell B3. Now enter the rest of the values shown in column B of figure 3 and press CALC. Cell C4 shows that the return on your investment of \$8,450 is 8.713%.

Now you can use the template to determine the price of a similar bond with a yield of 10%. Enter .1 in cell B4, erase cell B5 by highlighting it and pressing MACRO-E, and press CALC. Cell C5 shows you that the appropriate price for such a bond is \$7,507.22.

You can also use this worksheet to evaluate automobile leases. Suppose you'd like to lease a car for three years. The car costs \$15,000 and will have a resale value of \$6,000 at the end of the term. If the interest is 11% per year, what should your monthly payment be? Assume that under this lease agreement, payments are due at the beginning of each month.

Clear the known values with MACRO-W, and make the following entries:

Cell	Entry	Cell	Entry
B2	M	B5	15000
B3	36	B7	36
B4	11%	B8	6000

Press the CALC key, and cell C11 shows you the monthly payment amount, \$346.47. You refer to cell C11 instead of cell C6 because this is an annuity-due lease (payments are due at the beginnings of periods).

As a final exercise, let's use the template to evaluate adjustable-rate mortgages. The trick here is to regard as a balloon payment the balance still unpaid when the interest rate changes, since that's the amount you'd need to pay off the mortgage. The template can compute that amount for you. If you don't already know what the payment will be, determine it by making entries in the first four known-values positions. Consider, for example, a mortgage of \$150,000 with a 30-year term, monthly payments, and an interest rate of 10.5% for the first three years. Clear the known values by pressing MACRO-W, and make the following entries:

Cell	Entry
B2	M
B3	360
B4	10.5%
B5	150000

Press the CALC key, and cell C6 displays \$1,372.11. This is what the monthly payment would be if the interest rate remained constant for the entire 30 years. Now position the cell pointer on cell B6 and "capture" the value in cell C6 by pressing MACRO-C. To determine what the outstanding balance will be in three years, enter 36 in cell B7 and press CALC. Cell C8 displays \$147,490.41. To determine the dollar amount of the interest paid during the three years, move the cell pointer to cell B8, press MACRO-C, and press CALC. Cell C9 displays \$46,886.33. At the end of three years, start the process again, using 324 as the number of periods, the new rate for the mortgage as the annual interest rate, and \$147,490.41 as the principal. ■

Jacob Heshes is a CPA, retired after 40 years of public practice in New York. He is currently a programmer of business applications.

Turn your spreadsheets into all these charts with a single command: Call 1-800-426-7682.



For a limited time, you can get a free Graphwriter® II Autocharting Kit. Just call 1-800-426-7682 and ask for either AMR-2733 (5.25") or AMR-2738 (3.5"). The kit demonstrates how easy Graphwriter II can make it to create stacks of charts from your spreadsheets. And update them with a single command at DOS.

You'll find Autocharting is a real time saver, especially if your spreadsheet numbers are always changing. With Graphwriter II, you only set up your charts once. Updating is simple because the program gives you a direct link between your charts and your 1-2-3® or Symphony® files. Change your spreadsheet numbers and voilà, your Graphwriter II charts will automatically reflect the new data when you print them.

And the charts will always look terrific since Graphwriter II automatically adjusts their layout to accommodate changing data. So if, for example, you make a chart with a single bar for January sales, it'll still look good in December with year-end numbers.

The point is, Graphwriter II is the perfect software for creating charts for daily inventories, monthly sales, weekly interest rates, stock market fluctuations and everything else that constitutes periodic reporting.

Call the 800 number or send in this coupon today for your free Graphwriter II Autocharting Kit. Turning spreadsheets into charts has never been this simple.

Free Graphwriter II Autocharting Kit. Call 1-800-426-7682 and ask for AMR-2733 (5.25") or AMR-2738 (3.5"). Or mail this coupon to: Lotus Development Corporation, Department GW, P.O. Box 9158, Cambridge, MA 02130-9844.

Name _____ Phone () _____
Company _____
Title _____
Address _____
City _____ State _____ Zip _____
Please specify disk format. _____ 5.25" or _____ 3.5"

**Lotus® Graphwriter II
Free Autocharting Kit**



Behind the Hype for GROUPWARE

BY LINDSY VAN GELDER

Everybody's heard the buzzword by now: *groupware*, which is known in academic circles as computer-supported cooperative work. The term *groupware* strikes a responsive chord—the realization that we're at a point where we need to use computers as tools to promote teamwork and thereby increase productivity.

There's less consensus about exactly what groupware is, what it can do, and how well it does it.

In fact, we know very little about groups themselves. Basic research has still not answered the fundamental question: How do people work together?

This lack of information has not kept software developers from introducing groupware programs, however. The overall goal of these programs is to help a group work together more efficiently. How each program tries to accomplish this objective varies widely. There are programs that help form a group, focus its attention, assign tasks, structure those tasks, record progress, and so on. At the broadest level, groupware is software—and if necessary, hardware support—for people who work together.

That's a far cry from the origins of the personal computer. When the microcomputer began to invade the business world in the early 1980s, it wasn't called the *personal* computer for nothing. As the industry endlessly reminded us, the whole point of the personal computer was that it wrested away the power hitherto hogged by the mainframe priesthood and gave it to the lone user. Over time, the actual autonomy of the PC has been drastically altered by local area networks, or LANs. But the notion of the hardy individual user plugging productively away at his or her personal task has remained.

In fact, from the proliferation of PCs, one would guess that what businesspeople do all day is process words or crunch numbers. The truth is that most office workers still spend a huge chunk of their time interacting not with machines but with other people. According to one recent study done at the Wharton Center for Applied Research, the typical senior manager spends 23 hours a week in meetings alone.



The software has users, but its promise rests on shaky assumptions.

If anything, the trend toward group work is increasing. That's due to the introduction of Japanese-style management techniques and what business commentator Peter Drucker described in the January/February 1988 issue of the *Harvard Business Review* as "the new organization," with its emphasis on information-based businesses and nonhierarchical teams of task-oriented specialists. At the same time, the microcomputer has made it possible for increasing numbers of people to work at home or on the road—a situation that should create a demand for new ways to communicate with the rest of the work group.

MORE THAN NETWORKING

The PC may be the technology of choice for individual work, but it hasn't—with the possible exception of electronic mail (E-mail)—made much of a dent on the work of groups. Not surprisingly, the PC industry would like to step into the breach and give all those LANs something to do besides serve files and share laser printers. Groupware is the answer. But groupware isn't simply networking, and it isn't just a bunch of people who all happen to be using their laptops at the same meeting.

Paul Saffo, a research fellow at the Institute for the Future (an independent research group, based in Menlo Park, Calif., that assesses emerging information technologies), makes a useful distinction. While many products can be used by groups, he says, true groupware is "like a telephone—it can be used effectively *only* by two or more people." Beyond that definition, it may be helpful to divide groupware into two categories.

What might be called first-generation groupware consists of products that work primarily by giving people access to each other's documents. They include editing



programs like Broderbund's *ForComment* and, for the Macintosh, Mainstay's *Markup*. These let all members of a group enter comments or revisions on a document written by one member, while the program retains the original document in a file.

Other products in this first-generation category might be called electronic memo pads. They include such programs as Data Access's *Office Works*, Imagine Software's *Perfect Timing* for the Macintosh, WordPerfect Corp.'s *WordPerfect Office*, and Enable Software's *Higgins*. These packages offer tools such as E-mail, on-line address and phone books, document filing systems, and "calendarizing," which lets the computer look at group members' individual schedules and suggest the most convenient time for meetings.

Except for calendarizing, first-generation groupware provides nothing that remotely resembles artificial intelligence. *ForComment* doesn't edit your articles; it simply provides the medium for them to be edited. This product and other first-generation groupware programs in effect do nothing more than take the place of paper, although their proponents would argue that they're neater and more efficient.

BECOMING AN ACTIVE PLAYER

The next generation of groupware consists of products whose purpose is far less transparent. In fact, they aim to transcend their role as the medium in which the group works and become an integral part of the group's dynamics. They are more like second lieutenants who actively organize not only what you do but how you do it.

A position statement from the maker of *Syzgy*, one of the second-generation programs, clearly indicates that a greater degree of managerial control is what distinguishes its product from the electronic memo pads: "What good does it do to have all your to-do lists and calendars neatly organized if what you're doing has little bearing on corporate objectives? [Some programs] can easily lead to elaborate ritualistic systems for managing individual or group information that becomes increasingly isolated from management concerns. The key [question is]: Does the software give managers more control, or take it away?"

It's true that sometimes groupware programs are designed to control rigidly the way a group works. For example, some people have called Action Technologies' *The Coordinator* "fascist software" because it makes users adopt not just a method of communicating with each other but an entire philosophy of communication. That thrust was obvious in the program's jargon-laden first version.

At the heart of the program, which also includes E-mail and scheduling, is a feature known as "conversation management." The program allows the sender to designate each communication as belonging to one of seven categories: a question, an offer, a request, a promise, a what-if



The typical senior manager spends 23 hours a week in meetings.

speculation, a simple note, or information. The program requires that you answer messages, automatically acknowledges receipts, and files all correspondence in a meaningful way. You can turn on your computer and get a list of what everyone else on the team has already committed to have done for you by today. You'll also have a list of who hasn't answered your requests, and you can trace all your correspondence with any individual.

The Coordinator helps diminish the time and effort spent managing projects. It acts as a zealously organized manager might, making everyone accountable by keeping tabs on the status of each individual's tasks in a given project and ensuring that no details are lost.

The program is one of the most successful groupware entries, with an installed base of more than 50,000 users. It was designed by Fernando Flores, a former Chilean finance minister with an interdisciplinary Ph.D. from the University of California at Berkeley (his thesis was on communication and management in the office of the future). Action Technologies' chief systems architect is Flores' longtime associate, the noted Stanford University Associate Professor of Computer Science Terry Winograd.

A less overtly ideological program is Information Research Corp.'s *Syzgy*. According to *Webster's Ninth New Collegiate Dictionary*, the word, pronounced SIZZ-a-gee, means "the nearly straight-line configuration of three celestial bodies (as the sun, moon, and earth during a solar or lunar eclipse) in a gravitational system." Officially launched at last fall's Comdex, the program is now completing beta testing.

Unlike *The Coordinator*, *Syzgy* uses familiar-looking forms and templates, which can be customized by users, to structure group interaction from the top down. The program includes scheduling and to-do lists for groups and individuals; hierarchical activity lists for delegating work, setting deadlines, and assigning budgets and priorities for every task; and multilevel Gantt charts that display project-schedule information by the day, week, or month. The Gantt charts, in Information Research's words, let you "see the big picture of every project" or "zoom in to ride herd on specific tasks that are holding up major projects, instantly pinpoint[ing] who's responsible and what they're working on."

Yet another new program, SwixTech's *SuperSync*, is a completely different breed. Billing itself as "team dynamics software," it promises to help managers choose teams of individuals who will work well together and to break

up unproductive cliques and ferret out troublemakers on existing teams.

SuperSync was designed by Anthony Adams, who for many years ran a landscape architecture business in Tucson. "One of the most frustrating parts of running a business is that there can be some conflict in a group that you don't even know about and that has nothing to do with the job," says Adams. "Then you turn around and find that because of this conflict, someone you hired has quit and gone to work for your competitors and become the star of their show."

A second formative experience for Adams was working for five years in the Middle East with workers from many cultures. "It wasn't always easy to understand how people were relating to one another," says Adams. "But this is an area that American companies will have to pay more and more attention to as they expand internationally."

SuperSync asks team members a battery of questions, which can be customized by the manager. The questions might ask employees who among their coworkers is the best informed, the most popular, or the one who would be their first choice for a working partner if they were given a new and unfamiliar assignment. The program assumes that their answers are truthful. Adams says that's not a problem, since "all but maybe 2% to 5% of people really are keen to know how they fit into the group and make the team better." While you can fool the boss, says Adams, "you usually can't fool your peers." *SuperSync* tabulates the responses and produces a dazzling display of charts showing the strengths of all the team members and their relationships with each other.

SALES ARE SLOW

The real question about groupware is, Does it work? The answer: It may be too early to tell. As a whole, groupware products aren't selling all that well. And although there are some satisfied customers for those products that have been out for a while, the few independent researchers who are studying the field have plenty of doubts, as we shall see. They say that, at best, groupware is being used right now as glorified E-mail rather than as a quantum leap into new teamwork tools. Indeed, finding people who use all of the available bells and whistles beyond E-mail, says researcher Paul Saffo, "is sort of like finding the subject of that story about the woman who put her dog in the microwave. Everybody knows about her, but how many people have tracked her down?"

So maybe the question to ask is, Is it worthwhile to use groupware merely as E-mail?

One customer who answers with a resounding yes is Ken Nickerson, manager of information technology at Rogers Communications, a Toronto-based company with interests in cable television, cellular phones, radio, network services, and other media operations. Some 200 Rogers em-

ployees across Canada have been working together for more than a year through *The Coordinator*. Although few of them use the scheduling feature, they use the conversation-management feature to the tune of more than 5,000 messages a month to track numerous projects.

Nickerson says the program has changed the way people work. "The biggest change was that we were able to get more people involved and bring more expertise to a decision," he says. In the past, the company might have thought twice before it flew people in from Vancouver for a meeting. "Now," he says, "you might have three people making the decision, but they have the benefit of twenty other people giving input."

IT'S A LITTLE SCARY

The input, moreover, is well documented. "We print it out, it's permanent, and it can be referenced," says Nickerson. "That's a little scary, but it makes you communicate differently and better."

Paradoxically, Nickerson finds that communicating is also easier. "You go for brevity," he says. "Just yesterday I sent to the vice president of operations a memo that, in the past, I would have spent a lot of time being meticulous about—making sure I had the right letterhead and checking the grammar 50 times. But last night I sent it from home, just like that. You tend to 'talk' as you would on the phone—less formally, far more friendly, directly to the point, and 100% action oriented, with a lot less bull."

Another change is that people are bringing home more of their work. "Employees who used to be watching TV are now sitting at the laptop, hammering out a few messages," Nickerson says. The result is that there are far fewer meetings. When the company does have them, Nickerson says, they're no longer information meetings because that's been taken care of; they're action meetings. "The feeling is, Let's have no more show-and-tell; let's *do* it."

Nickerson says the only downside his company has found in using *The Coordinator* is an information glut—a tendency for managers, especially, to feel that if messages are there, they are there to be read. "People send copies of everything," Nickerson says, "and it can get to be too much." But he sees this problem as a flaw with *The Coordinator* rather than with groupware in general. He'd like to see something comparable to an executive flipping through a newspaper. "I want to be able to do that with E-mail," he says, "that is, use keywords to read what I want



At best, some say, groupware is being used as glorified E-mail rather than as a quantum leap into new teamwork tools.

to read and have the rest on file." Nickerson's wish list also includes a way to embed voice mail inside E-mail.

Fancy features require a sturdy hardware platform with a highly intuitive user interface. Indeed, several software companies with unreleased PC-groupware programs, such as Lotus Development Corp.'s *Notes* and Coordination Technology's *CTI*, are apparently electing not to use Microsoft's *Windows* environment and are holding out for more memory under OS/2 and Presentation Manager. The Macintosh IIx and, in particular, Steve Jobs's Next machine are also seen as future groupware platforms.

WHAT MAKES GOOD GROUPS?

But some observers feel that hardware is the least of groupware's problems.

According to Christine Bullen, assistant director of the Center for Information Research Systems at Massachusetts Institute of Technology's (MIT) Sloan School of Management, groupware is being designed without much understanding of how groups actually work. Indeed, Bullen adds, there isn't much research on how groups work. In contrast, the software designers of decision-support software had a lot to go on, she says. They studied how individuals make decisions and used this information to influence their software design. That information base doesn't exist for groupware design. Says Bullen: "We really don't know what makes good groups or bad groups."

Bullen, who has worked in the teleconferencing field for a decade, is currently studying some 20 companies across the country that have installed *Higgins*, *The Coordinator*, *ForComment*, and other groupware programs. The news isn't good.

For starters, there is worker resistance. People don't like to change their work habits unless they perceive a real benefit. Only in unique work situations that require it do people experiment with new technology. "In familiar, ongoing situations in which they're not under pressure," Bullen says, "people like to work the way they are used to working, and the benefits of learning a new way aren't so obvious. That's just human nature."

The same thing was said about computers five or ten years ago, and plenty of technophobes were eventually won over. But, according to Bullen, even those who think they like groupware often aren't using it effectively—an indication that the products aren't addressing real needs.

Take electronic calendaring, for example. It really changes the way you work, Bullen notes. It takes group commitment and group permission to say, "Do this horrible thing to us." Electronic calendaring isn't a matter of just a record of a date and time you have to be someplace—it's a matter of whether you're willing to have your life scheduled by someone else, she says. The same problem holds with project tracking. "You're asking the whole group to commit to look at things in a way they haven't before."

Groupware, especially the second generation, almost by definition comes with its own agenda, since it makes implicit assumptions about what kinds of group activities are worthwhile and what assistance groups need in performing them. For instance, the philosophy behind *The Coordinator* assumes that groups need rigid structure and explicit terms with which to think about their work.

Some other programs may not arrive at the workplace with such an articulated philosophy, but they do reflect values. For instance, *Szyzygy* and *SuperSync* may fall under the groupware rubric, but they're not really aimed at the nonhierarchical teams of Peter Drucker's "new organization." They are explicitly geared to top-down managers intent on cracking the whip and cutting out the deadwood. When groupware meets resistance in the workplace, it might be because of its values, not its inherent potential as a productivity tool.

Very different groupware is currently coming out of Scandinavia, according to former MIT Assistant Professor Irene Greif, now with Lotus Development Corp. and editor of *Computer-Supported Cooperative Work: A Book of Readings* (Morgan Kaufmann Publishers, 1988). Greif chaired the 1988 Conference on Computer-Supported Cooperative Work last fall in Portland, Oreg., where Scandinavian researchers submitted five of the thirty papers under discussion.

In Scandinavia, Greif says, the philosophy underlying all new groupware is cooperation. Unions have a strong say about how technology is brought into organizations and even how it's designed. "There's a real emphasis on bringing in those who use the software and a real synergy between designers and users," she says. "Programs that would devalue people are rejected." According to Greif, "The question designers are asking users is, What kind of tools would enhance your work, not replace you?"

Barbara Garson, author of *The Electronic Sweatshop: How Computers are Transforming the Office of the Future into the Factory of the Past*, says the monitoring made possible by groupware is used not only to find out how fast each person is working at each moment, but also to prescribe exactly how each worker should do his or her job. The question is, Does this give people enough freedom to perform their jobs the way they want? The classic example, says Garson, is sales. Salespeople have their own ways of getting sales, and they don't necessarily want the boss to be in on it. Reporters are the same way; maybe they don't want their editors to know how simple



'While you can fool the boss, you usually can't fool your peers.'

it was for them to get a particular story. Reporters also may not want their editors to know how many stupid mistakes they made. "So what they end up doing," says Garson, "is keeping two sets of books or making things up after the fact, as long as the results seem plausible—the same way people do with expense accounts."

The Institute for the Future's researcher Paul Saffo thinks groupware is "less important as a product category than as a new spin on this thing we call personal computing." An important question to ask, Saffo says, is whether something is a good product, aside from the groupware dimension. The real trend is toward products that have the groupware dimension built in where it's needed—such as a version of *Microsoft Word* containing *ForComment* features.

BEYOND A TECHNICAL SOLUTION

People should also question the assumption that just because a particular group task *can* be done on a computer, a computer therefore is the mechanism by which it *should* be done. According to MIT's Bullen, even where calendaring programs are designed to be as nonintrusive as possible (for instance, allowing group members to keep their personal appointments confidential), "most people would rather use their Day-Timer, paper clips, and those little sticky things." She adds, "I don't know how you could do that technically and give people something they could still carry around with them."

Roger Knake does use *The Coordinator's* calendar feature in his work at Xitel Inc., a software-development company in Berwyn, Pa. However, he admits he resisted it for a year and still carries a paper daybook. Knake, who communicates with sales staff all over the country, is also a fan of working within groups that are connected electronically. Sending messages electronically, he says, "enables me to do more-structured thinking because it's conversational *and* because it's written. I used to type lengthy epistles; now I can get into chitchat mode. At the same time, because I'm doing the typing, it makes me think, so it's a real good compromise." The problem for Knake is that he's become too enamored of the technology.

"If you don't watch it, you'll get trapped," Knake says. "Sometimes you end up writing when you need only pick up the phone and talk to someone. You get into the habit of being very much to the point, so when you put things in writing, you tend to ignore people's feelings. You don't see what happens to them when they read your message."

Systems that combine technologies may be the wave of the future. One early entrant in the field is the Wang Freestyle personal computer system, which combines a computer, a printer, a facsimile card, a full-page tablet that allows workers to enter handwritten notes into the computer, and a telephone-like handset that can simultaneously record voice comments. A printer and scanner



Researchers have still not answered the fundamental question: How do people work together?

are optional. Both handwritten and voice notes can be sent to any other Freestyle user via Wang's VS office network. All this is not cheap: Each workstation on the system costs nearly \$12,000.

Sociologist Robert Johansen, who works at the Institute for the Future, is the author of *Groupware: Computer Support for Business Teams* (The Free Press, 1988). This and Greif's book are probably the Bible and Koran of the groupware field. Johansen divides group work into four kinds: same time/same place (normal face-to-face meetings); same time/different place (teleconferencing); different time/same place (colleagues who work different shifts but who need to communicate with each other); and different time/different place. Most of the groupware action in the short term, Johansen predicts, will happen in the different time/different place quadrant, where E-mail is already one of the best technologies available.

THE NEW 'HORSELESS CARRIAGE'

"Groupware for same time/same place activity is difficult to sell," Johansen adds, "because people don't want to spend a lot of money on high-tech conference-room equipment." Any computer product would have to replace the functions of telephones, overhead projectors, scanners, and whiteboards. The exception, according to Johansen, would be some undreamed-of future product that goes beyond what he calls "the horseless carriage"—in other words, something that doesn't merely copy an existing function. For example, a product that makes a record of the meeting and inserts it into each attendee's computer file might be a smash success.

Johansen cautions that "there's been a lot of hype about groupware, so there's bound to be a lot of disappointment." But, he adds, two basic forces are driving groupware: First, millions of business teams need something to help them work together better. Second, the personal computer is too personal; it's gradually becoming the interpersonal computer.

According to Johansen, groupware is one of the few things that's developing in terms of user needs. "Groupware," he says, "will be oversold, and there will be resistance to it. It will probably take five years for these products to be used on a wide scale. But that's good news for the user because [by then] they'll be good products." ■

Lindsay Van Gelder is a free-lance writer in New York City who admits she works best alone, not in groups.

TO BUY OR NOT TO BUY

Owning your own home
is the American Dream.
Is it profitable?

BY STEPHEN L. NELSON AND
SUSAN R. NELSON

When you look at a house for sale, you wonder if the roof leaks and whether the neighbors will be friendly. Chances are, you also wonder if the house is a good investment.

A spreadsheet can't help you with the roof or the neighbors. But a model can help you determine whether owning a house is more profitable than an alternative investment.

Based on some data describing the specific purchase you're considering, the model forecasts the yearly cash flows that derive from owning your home. Once you've estimated the cash flows, you use two standard profit measures, the internal rate of return (IRR) and the net



present value (NPV), to assess the economics of buying instead of renting your home.

The logic of the model is simple. It looks at:

- what you save by owning—namely, income tax deductions and the rent you don't pay
- the additional costs you incur, such as maintenance, property taxes, homeowners insurance, and the mortgage
- any appreciation that may occur

Be aware that the analysis compares the economics of owning instead of renting a *specific* residence. If you currently live in a studio apartment but want to buy a four-bedroom house, you can't logically say that the rent you're saving is what you're currently paying for your studio apartment.

The model relies on your gathering several items of data, shown in figure 1. Some of the data is easy to get, some of it not so easy. If you're not familiar with the terms used in column A, you should review the brief explanations that are printed in the box below. Once you understand those terms, build the model by following the directions in the box on page 79.

HOW THE MODEL WORKS

Figure 1 contains three calculated results shown in range B17..B19: the mortgage payment, the return on investment, and the dollars of profit. These values tell the

	A	B	C
1	To Buy or Not to Buy?		
2			
3	Model Data and Results		
4	-----		
5	Annual appreciation rate	4.00%	
6	Annual income percent	6.00%	
7	Home purchase price	\$100,000	
8	Down payment percent	20.00%	
9	Closing costs	\$2,500	
10	Annual interest rate	10.00%	
11	Mortgage term (in years)	30	
12	Selling costs	7.00%	
13	Marginal tax rate	28.00%	
14	Holding period	10	
15	Alternative investment rate	8.00%	
16	-----		
17	Monthly mortgage payment	\$702.06	
18	Return on investment (IRR)	13.16%	
19	Dollars of profit (NPV)	\$12,740	

FIGURE 1. After supplying the data shown in range B5..B15, the model uses the cash flows in figure 2 to determine whether owning your house is more profitable than an alternative investment. Here the house has an internal rate of return, shown in cell B18, of 13.16%, which beats, by over 5%, the alternative investment return of 8%, shown in cell B15. The house also generates a net present value of \$12,740, meaning that the return on the house exceeds the 8% return available on an alternative investment by almost \$13,000.

WHAT THE TERMS MEAN

Annual appreciation rate is an estimate of the yearly percent increase in the value of the house. This rate combines the effects of inflation and increased market demand. Much depends on the specific house you're analyzing. Consult your local real estate broker or appraiser for a rate that applies to your area.

Annual income percent is the profit the house will generate by saving you rent less the expenses you'll pay as a homeowner. For your analysis, use an annual income percent, also called a capitalization rate, supplied by your local real estate broker or appraiser.

Home purchase price is the total amount you'll pay the current owner for the house. If you're looking at a \$100,000 house, enter \$100,000 as the value.

Down payment percent is the percentage of the purchase price you'll need to put down in cash. The rest of the price will be covered by the mortgage. The usual range is 10% to 20%.

Total closing costs is the miscellaneous expenses related to buying and financing a house purchase. These include loan fees, title and private mort-

gage insurance, credit reports, appraisals, and so on. They usually amount to 3% to 6% of the loan amount.

Annual interest rate is the annual interest rate of the mortgage. Mortgages with a rate that varies over the term have become popular in recent years. This model, however, assumes a fixed-rate mortgage.

Annual interest rate is *not* the annual percentage rate (APR), which includes some of the costs you pay in order to obtain credit. The APR, required by the truth-in-lending law, is valuable because it takes into account such items as loan fees and so allows you to compare true loan prices. But this model considers those extra costs under closing costs.

Mortgage term is the maximum number of years the mortgage may be outstanding. Mortgage terms typically run from 15 to 30 years. The shorter the term, the higher the monthly payment but the lower the total interest.

Selling costs are the expenses you will eventually incur when you sell the house. They include such items as the sales commission and the attor-

ney's fees. As a rule of thumb, selling costs run about 7% of the total sales price.

Marginal tax rate is the highest rate at which your income is taxed. You can use your federal tax bracket. For our purposes, we'll use 28%. For greater precision, you ought to add your effective state and local tax brackets (if any) as well. In the case of a 28% federal bracket, your effective state/local bracket would be $(1 - 28\%)$, or 72%, of the total of your state and local brackets.

Holding period is the number of years you expect to hold your house investment. The holding period may affect the profitability of the investment, so experiment with alternative values.

Alternative investment rate is the highest rate of return that you could earn on an investment other than a house. Because the model calculates after-tax profit, specify an after-tax rate of return. For example, you might find a certificate of deposit that pays 10%. If you're in the 28% tax bracket, the after-tax return is 7.2%, calculated as $(1 - 28\%) \times 10\%$.

	G	H	I	J	K	L	M	N
1	Cash Flows of Owning Your Own Home							
2								
3	House Value	Closing/	Loan	Annual	Annual	Income	Net Cash	
4	(Purchase/	Selling	Funding/	Rental	Loan	Tax	Inflows/	
5	Year Sale Price)	Costs	Payback	Income	Payments	Savings	Outflows	
6								
7	0	(\$100,000)	(\$2,500)	\$80,000				(\$22,500)
8	1	0	0	0	6,000	(8,425)	2,234	(190)
9	2	0	0	0	6,240	(8,425)	2,221	37
10	3	0	0	0	6,490	(8,425)	2,207	272
11	4	0	0	0	6,749	(8,425)	2,191	516
12	5	0	0	0	7,019	(8,425)	2,173	768
13	6	0	0	0	7,300	(8,425)	2,154	1,029
14	7	0	0	0	7,592	(8,425)	2,133	1,300
15	8	0	0	0	7,896	(8,425)	2,109	1,580
16	9	0	0	0	8,211	(8,425)	2,083	1,869
17	10	148,024	(10,362)	(72,750)	8,540	(8,425)	2,054	67,081

FIGURE 2. The cash flows that result from owning your own home.

whole story of whether you should rent or buy.

To calculate the monthly mortgage payment, shown in cell B17, you use the `@PMT` function, which requires three arguments: principal amount, interest rate, and number of payments. The formula calculates the principal amount as the purchase price, in cell B7, times the percent financed, which is 1 minus the value in cell B8. It converts the annual interest rate from cell B10 to a monthly rate. It also converts the mortgage term from cell B11 to the number of months.

Review the resulting monthly mortgage payment, which in this example is \$702.06. Lenders typically warn that housing expenses, which include the mortgage payment, homeowner's and mortgage insurance, and taxes should not exceed 25% to 28% of your gross monthly income. If your calculated expenses exceed these rates, you may have trouble obtaining a mortgage.

To assess the profits of home ownership, the model uses an `@IRR` and an `@NPV` formula. If you need a quick refresher on the theory behind the internal rate of return and net present value measures of profitability, see the box on page 80.

The internal rate of return calculation evaluates the cash flows stemming from home ownership, as shown in range N7..N17 of figure 2. It expresses the profit from the home investment as an annual percentage of the investment, as shown in cell B18 of figure 1.

The `@IRR` function needs two arguments: an initial guess, which it uses to begin its search for an IRR, and the range of cash flows. For this formula, we'll use the annual interest rate in cell B10 as the guess.

This hypothetical home purchase returns an annual profit of about 13.16%. By comparing this figure with an alternative investment rate, shown in cell B15 of figure 1, you can roughly gauge the profitability of home ownership. In this case, the house beats the alternative investment by more than 5%.

The net present value calculation also evaluates the cash flows stemming from home ownership. It expresses

the dollar amount by which the house investment either exceeds or falls short of what an alternative investment could deliver.

The `@NPV` function requires two arguments: a discount rate, which it uses as a benchmark to measure the investment, and the range of cash flows. For this formula, we'll use the alternative investment rate as the discount rate.

The `@NPV` function assumes that the first cash flow occurs at the end of the first year. Typically, though, the first cash flow occurs at the beginning of the first year. When this is the case, don't include the first cash flow in the `@NPV` cash flow range.

Instead, add it to the calculated result of the `@NPV` function. For example, the dollar-difference formula for the 10-year holding period is `@NPV(B15,N8..N17)+N7`. Cell B15 contains the alternative investment rate, range N8..N17 holds the cash flows for years 1 through 10, and cell N7 holds the cash flow occurring at the beginning of the first year.

For an investment in a house to be preferable, its net present value should be zero or greater than zero. The net present value of this house investment, as shown in cell B19, is \$12,740. That means that the return on the house exceeds the 8% return available on an alternative investment by almost \$13,000.

ABOUT THOSE CASH FLOWS

Let's look at those cash flows in figure 2 more closely. Most of the figures in columns H through J are calculated by means of `@IF` formulas. In each case, the formula first looks to see "if this is the year to sell the house." It does this by comparing the year of ownership in column G with the holding period in cell B14 of figure 1. If this is not the sale year, the formula returns a zero. Since the only row in column G that matches the holding period is row 17, the formula returns a zero in most cells of columns H, I, and J.

The *House Value (Purchase/Sale Price)* column, column H, calculates both the house purchase amount and the house sale price. The house purchase price in cell H7 comes from cell B7 of figure 1. In cell H17 the `@IF` formula calculates the house sale price as the original price inflated by the annual appreciation rate, shown in cell B5 of figure 1, for each year since the purchase. Given the model data, this house's value increases by almost \$50,000 in just 10 years.

The *Closing/Selling Costs* column, column I, calculates the costs related to first buying and later selling the house. The closing costs figure in cell I7 comes from cell B9 of figure 1. The selling costs figure that appears in cell I17 is calculated by multiplying the selling costs percent,

shown in cell B12 of figure 1, by the sales price in cell H17.

The *Loan Funding/Payback* column, column J, shows the original mortgage amount and, at the bottom, the amount you will still owe the bank at the end of the holding period. The original mortgage amount is calculated in cell J7 as the house purchase price times the percent financed. Calculating the amount you owe when you sell the house is a little more work, since you need to deduct the principal you paid as part of your mortgage payments over the 10 years. An @IF formula that incorporates an @PV function does the job.

The *Annual Rental Income* column, column K, represents the annual economic benefit you enjoy by owning rather than renting your house. Here, an @IF formula checks to make sure that the current year is less than or equal to the end of the holding period. If so, it adjusts the purchase price by adding the compounded annual appreciation and multiplies that value by the annual income percent.

For example, in the first year, your house is worth \$100,000. You calculate that you save \$6,000 by owning rather than renting by multiplying the annual income percent of 6% by \$100,000. For the first year you realize no appreciation. Then, each subsequent year, you enjoy a little more income, since your house appreciates 4% and continues to realize an annual income of 6% of the total appreciated value.

The *Annual Loan Payments* column, column L, uses an @IF formula that first checks to be sure that the current year is within both the holding period and the period of

the loan. It then multiplies the monthly mortgage payment by 12.

The *Income Tax Savings* column, column M, calculates the reduction in your annual taxes that results from the home mortgage interest deduction. The formula is cumbersome, but its logic is simple. Income tax savings are calculated as the annual mortgage interest multiplied by the marginal tax rate, shown in cell B13. Annual mortgage interest is calculated as the total annual mortgage payments less the portion of the payments that represent principal. To calculate the principal paid during a year, formulas in range M8..M17 use the @PV function to calculate the mortgage principal balance at both the beginning and end of the year, and then find the difference.

Note that the model does not calculate the taxable gain on the future sale of the house. You'll want to consult your tax advisor for detailed information on this point. However, by using two federal income tax law provisions, you'll probably be able to avoid most of the tax on home-ownership gains. The first states that if you buy a new home of equal or greater value within two years of selling your old home, you may defer any home-ownership gain in your calculation of taxable income. Ultimately, of course, you may sell a home and decide not to purchase another. At that time, you'll include in your taxable income all the gains you've deferred over the years. But that's when the second provision takes effect. If you're 55 years old or older, you get a one-time exemption of up to \$125,000 of the gain on the sale of your primary residence. This means that by combining the two provisions, you may not have to pay any income taxes or else pay a

HOW TO SET UP THE WORKSHEET

1. Individual column widths

Column	Width
A	29
G	5
H	12
I	10

For example, to set the width of column A, place the cell pointer in column A, and select

1-2-3: /Worksheet Column Set-

Width, enter 29

Symb: MENU Width Set, enter 29

2. Labels

Enter the labels shown in range A1..A19 of figure 1 and range G1..N6 in figure 2. To create the dashes, enter \- in the cell and copy as necessary.

3. Values

Enter the values shown in range B5..B15 in figure 1 and cell G7 of figure 2.

4. Enter and copy formulas

Cell	Formula
G8	=G7+1
H7	=B7
H8	@IF(G8=\$B\$14,\$B\$7*(1+\$B\$5)*G8,\$0)
I7	=B9
I8	=B\$12+H8
J7	=B7*(1-BB)
J8	=@IF(G8=\$B\$14#AND#G8<=\$B\$11, @PV(\$B\$17,\$B\$10/12, (\$B\$11-G8)*12,\$0)
K8	@IF(G8<=\$B\$14,\$B\$7*(1+\$B\$5) ^G7*\$B\$6,\$0)
L8	@IF(G8<=\$B\$14#AND#G8<=\$B\$11, -12*\$B\$17,\$0)
M8	@IF(G8<=\$B\$14#AND#G8<=\$B\$11, (-L8+(@PV(\$B\$17,\$B\$10/12, (\$B\$11-G8)*12)-@PV(\$B\$17, \$B\$10/12,\$B\$11-G7)*12))) *\$B\$13,\$0)
N7	@SUM(H7..M7)

Copy cell N7 to cell N8.

Copy range G8..N8 to range G9..G17.

B17 @PMT(B7*(1-BB),B10/12,B11*12)

B18 @IRR(B10..N17)

B19 @NPV(B15,N8..N17)+N7

5. Cell formats

Format	Range
Percent 2	B5..B6, B8, B10, (Symb: % 2)
Percent 2	B12..B13, B15, B18
Currency 0	B7, B9, B19, H7..J7, N7
Currency 2	B17,
0	H8..N17
(Symb: Punctuated 0)	

For example, to set the format of range B5..B6, select

1-2-3: /Range Format Percent, press

Return, specify range B5..B6.

Symb: MENU Format %, press

Return, specify range B5..B6.

small amount on gains stemming from home ownership.

The model also assumes that the tax law allowing you to take the home mortgage interest deduction will remain in effect for the entire holding period. If you wish to test the profitability of home ownership without the tax deduction, enter 0 as your marginal tax rate in cell B13.

Finally, the *Net Cash Inflows/Outflows* column, column N, contains a simple @SUM formula that adds the positive and negative cash flows in each row. The resulting values are those used in the @IRR and @NPV calculations in cells B18 and B19 of figure 1.

EXPANDING THE MODEL

You may want to modify the model so that you can examine longer holding periods or include the costs of private mortgage insurance in your analysis.

To examine a longer holding period, first change the holding period in cell B14. Second, copy the contents of range G17..N17 down into as many additional rows as you need. And third, edit the @IRR and @NPV formulas in cells B18 and B19 to include the expanded range. For example, to evaluate a 30-year holding period, edit the @IRR formula in cell B18 to read @IRR(B10..N37) and edit the @NPV formula located in cell B19 to read @NPV(B15..N37)+N7.

You might need to include the cost of private mortgage insurance in your analysis. If you make a less-than-20% down payment, you may be required to pay for private mortgage insurance along with your monthly mortgage payments for some time. Payment of this extra amount may stop when you've paid a certain amount or when the mortgage balance reaches a certain minimum percentage of either the original purchase price or the current market value of the house. Sometimes a lender waives private mortgage insurance after you've proved yourself diligent and timely in your payments.

Because of the diversity in lending and private mortgage insurance practices, it's impossible to construct a formula that calculates private mortgage insurance payments. So, to include the cost of insurance in your analysis, insert a column in the middle of the cash flow section of the worksheet, say, between columns L and M, label it *Mortgage Insurance*, and then manually enter, as negative amounts, the annual expense of mortgage insurance. Then verify that the range in the @SUM formula located in the *Net Cash Inflows/Outflows* column, probably now column O, includes the column you've added. ■

Stephen L. Nelson is a regular contributor to LOTUS. Susan R. Nelson is manager of real estate marketing for the Seattle First National Bank.

@IRR CAN LEAD TO A BAD DECISION

Some terribly technical and convoluted definitions of internal rate of return (IRR) exist, but the concept and the calculation are simple and straightforward. An IRR is one measure of an investment's profitability. IRRs are not expressed in dollars or deuschemarks, but rather as a percent of the money invested.

For example, your friend received an annual IRR of 18% on a mutual fund. This means that in addition to recovering her original investment, she realized a profit of 18 cents on each dollar for each year of the investment. It's that simple.

However, the IRR measure presents a few problems. The first is that the IRR of an investment may not have a solution or it may have more than one solution. Typically, an investment requires you to make a cash outflow in the beginning, and then it produces cash inflows over the holding period. IRR works for this kind of investment. But for those investments where the cash flow is positive in some years and negative in others, there may be more than one solution. The solution that the @IRR function finds is simply the one that's closest to the initial guess that you specify.

As frustrating as it seems, this first problem pales next to a second, more serious, problem: The IRR measure may lead you to less than optimal investments. For example, say you have \$1,000 to invest, and you use the @IRR function to calibrate the profitability of

two investments. Investment A requires a \$1,000 initial investment and produces a 50% return for one year and then pays itself back. Investment B also requires a \$1,000 initial investment. It produces a 45% return for 10 years and then pays itself back. Investment B is probably the better choice. But if you look only at the IRRs, you'll miss the better investment. The bottom line is clear: Be careful when you use IRR as the only tool with which to evaluate an investment.

The net present value (NPV) measure is vastly superior to IRR because it has neither of the foregoing problems. The NPV measure tests whether a specific investment meets, beats, or falls short of the internal rate of return that you think you should get on your investments. Unlike IRR, NPV doesn't calculate a percentage return. Instead, NPV calculates how far away you are in present-value dollars from a desired IRR. If the NPV is zero, your investment produces an IRR equal to the desired IRR. If the NPV is positive, your investment produces an IRR greater than the desired IRR. If the NPV is negative, your investment produces an IRR less than the desired IRR. The rule of thumb is simple: To pick the best investment, pick the one with the highest NPV.

For more information on these profit measures, review "Understanding and Using @IRR" (February 1987) and "Evaluating Investments with NPV" (March 1986).

R.I.P.

A COMPANY WHOSE
TIME IS NOW PAST,
BECAUSE ITS
DECISION MAKING
WASN'T FAST.

You can write your company's future
on the blank above or on the coupon below.

Smart companies are finding there are only two management styles in today's uncertain and unforgiving marketplace.

The quick, and the dead.

Fortunately, the help you need to make successful, timely decisions is available from Dow Jones News/Retrieval. We'll give you 8 free* hours to discover how your company can use the same news and in-depth information we provide to most Fortune 500 corporations.

With just a personal computer and modem, you can get comprehensive corporate profiles—breaking business news, investment analysts' reports, 10-K data, company vs. industry comparisons, and more—in minutes. Plus, Dun & Bradstreet financial reports instantly.

As a member, you'll also have online access to the full text of *The Wall Street Journal* back to 1984 (exclusive to News/Retrieval) and a continuously-updated business report. Our stock quotes, with a unique news alert feature, will keep you informed on the companies you follow. And there's much more—over 40 services in all.

Call 1-800-221-7700, Ext. 340E to get the kind of information that can help assure your company a long and prosperous future.

Without it, your future may already be cast in stone.

**My business deserves a long
and prosperous future.**

Give me 8 free* hours of usage to see how Dow Jones News/Retrieval can enliven my company when you send me a \$49.95 Business Membership Kit including: passwords for me and my staff, one year of *Dowline*® Magazine, and waiver of my first year's \$18 annual service fee.

☐ Bill me later.

☐ Charge to my AMEX

Card No. _____

Exp. Date _____

Signature (required) _____

If you pay by credit card, all future charges will be billed to that account.

☐ Check enclosed for \$49.95.

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Daytime Phone _____

☐ Please send more information.

Mail to: DJNR Membership Kit, P.O. Box 186
Drexel Hill, PA 19342-9973

For faster service, call

1-800-221-7700, Ext. 340E today!

340 E

DOW JONES NEWS/RETRIEVAL

From Dow Jones & Company, Inc.

The information that powers today's business.™

*Per account. New domestic and Canadian customers only. Free time must be used within 30 days after receipt of passwords.
Some services have special charges that are excluded from the free-time offer. This offer expires May 31, 1990. © 1989 Dow Jones & Company, Inc. All rights reserved.

ANSWERS TO YOUR QUESTIONS ABOUT LOTUS PRODUCTS

1-2-3/SYMPHONY

ROUNDING TO \$5

Q. When building a worksheet for a price-markup analysis, I need to round up the final cost to the nearest multiple of \$5. For example, if the base price is \$730, the result of a 10% markup is \$803. I need to force the result of the markup to \$805. How can I do this?

Todd Barry
Los Angeles, Calif

A. Try our formula. Enter the labels and values in column A as shown in the following illustration. To format the values, select /Range Format Currency (in *Symphony*, MENU Format Currency), specify zero decimal places, and indicate A3..B6 as the range to format.

	A	B	C
1	Price	Cost	
2	-----	-----	
3	\$705	\$780	
4	\$839	\$925	
5	\$730	\$805	
6	\$654	\$720	

Enter the following formula in cell B3, and copy it to range B4..B6:

```
+A3*1.1 - @MOD(A3*1.1,5) +
(5*(@ROUND
(@MOD(A3*1.1,5),4)<>0))
```

The formula relies on the @MOD function to round values to the nearest \$5. The syntax of the @MOD function is @MOD(numerator,denominator). It returns the remainder of the integer division of numerator by denominator. In other words, @MOD(803,5) returns 3—the amount left over when you divide 803 by 5, without carrying the division into decimal places.

There are two key expressions in the formula we've provided. The first key ex-

pression is +A3*1.1. This expression appears three times in our formula. It calculates a value that is 10% greater than the value in cell A3.

The second key expression in the formula is @MOD(A3*1.1,5), which calculates the amount you need to subtract from the first key expression in order to round the first expression up to the nearest \$5.

The expression +A3*1.1 - @MOD(A3*1.1,5) calculates the 10% increase and rounds it up to the nearest \$5. If the increase is evenly divisible by 5, this part of the formula simply calculates the increase without rounding.

The expression + (5*(@ROUND(@MOD(A3*1.1,5),4)<>0)) adds 5 to the value of the previous expression only if that value had to be rounded. It adds 0 to the previous expression if the result of the increase had been evenly divisible by 5.

STRANGE CHARACTERS WHEN PRINTING

Q. When printing, I occasionally receive a strange character in the upper-left corner of the report (for instance, @ or Ø). Several people in my organization have had the same problem. What causes this?

Patrick J. Cardomone
Jersey Central Power & Light Co.
Morristown, NJ

A. The problem usually arises when you use an invalid setup string (in *Symphony*, initialization string).

When 1-2-3 and *Symphony* encounter a character they can't recognize in a setup string, they print the character in the upper-left corner of the report. Make sure your setup string is entered accurately. Common errors include using a slash (/) instead of a backslash (\) or a zero instead of the letter O. Also, it's common to use uppercase and lowercase characters incorrectly. You must en-

ter a setup string exactly as it appears in the printer manual.

If changing your setup string does not solve the problem, verify that you are using the correct printer driver. In 1-2-3 select /Worksheet Global Default Status (in *Symphony*, SERVICES Configuration). If this is not the correct driver, repeat the Install process and select the correct driver.

USING SPREADSHEET DATA IN THE PRINT HEADER

Q. It would be convenient to be able to include spreadsheet information in the print header. Is there a way to call a cell address into the print header?

Ken Erickson
St. Helens, Oreg

A. There is no built-in mechanism that lets you include the contents of a cell in a print header. You can, however, have a spreadsheet range appear at the top of every printed page. Select /Print Printer Options Borders Rows (in *Symphony*, SERVICES Print Settings Other Top-Labels), and indicate the rows to print on each page. Do not include these rows as part of your Print range.

CALCULATING FIRST-YEAR DEPRECIATION

Q. The article "Constructing Depreciation Schedules" [January 1987] was complete and easy to follow. However, I'm curious; is there a way to calculate partial year-end depreciation?

Carolyn Crosby
The Hampton Co.
Tucson, Ariz.

A. You can calculate partial year-end depreciation in both 1-2-3 and *Symphony*. In the worksheet, we entered the labels in rows 1 through 4 and range A5..A7. Then we entered the values in

range B5..B7 and used the @DATE function to enter the dates in column C. Then we selected /Range Format Date 4 (in 1-2-3 Release 1A, Date 1; in *Symphony*, MENU Format Date 4) and specified range C5..C7. To format the values in columns B and D for currency with no decimal places, we selected /Range Format Currency (in *Symphony*, MENU Format Currency), entered 0, and indicated range B5..B7. Then we repeated this step for range D5..D7. Finally, we entered the following formula in cell D5 and copied cell D5 to range D6..D7:

```
((@DATE(@YEAR(C5),12,31)-
C5)/365)*B5
```

	A	B	C	D
1				First-
2		Annual	Date	Year
3	Item	Depr.	Purch.	Deprec.
4	-----			
5	Copier	\$267	03/24/86	\$206
6	Printer	\$438	09/04/87	\$142
7	Desk	\$420	10/12/88	\$92

The @YEAR expression in the formula determines the year in which the asset was acquired. The @DATE function returns the serial number that represents the last day of the year (December 31). The formula then subtracts the purchase date of the item from the last day of the purchase year and returns the number of days the item depreciated during the first year. By dividing this number by 365, the formula determines what percentage of the year you owned the item. Finally, the formula multiplies the percentage by the depreciation and returns the first year's depreciation cost.

USING PASSWORD PROTECTION

Q. I would like to know how to password-protect my files. I have read the *Reference Manual*, but I'm still doing something wrong. Can you go over the steps?

Mitchell Page
Williams International
Ogden, Utah

A. To password-protect a file in 1-2-3, select /File Save (in *Symphony*, SERVICES File Save). Type the desired file name, but before you press Return, press the Spacebar and type the letter P. When you press Return, 1-2-3 and *Symphony* prompt you to enter the desired password. After you enter the password,

1-2-3 and *Symphony* prompt you to enter the password again to confirm that you know what you entered. Note that the password is case-sensitive. You must use the same sequence of lowercase and uppercase characters to retrieve the password-protected file.

Remember the password! Should you misplace or forget a password, there's no simple way to retrieve the file. Also, be aware that password protection doesn't protect a file from being erased or from being altered in any fashion through DOS.

Password protection is available in 1-2-3 Release 2/2.01 and *Symphony* Releases 1.1, 1.2, and 2.0.

AUTOMATICALLY GENERATE PART-NUMBER DESCRIPTION

Q. Our engineering department produces 1,000 to 2,000 drawings per year. We create a bill of materials for each drawing. We'd like to enter a part number and have the part's description appear automatically in the adjacent column. Can we do this in *Symphony*?

M. V. Ridlon
Orthlec Inc.
Alachua, Fla

A. You can obtain a description automatically by using the @VLOOKUP function. The syntax of the @VLOOKUP function is @VLOOKUP(selector value, Table range, offset number). The selector value is the part number. The Table range contains a list of part numbers paired with their corresponding descriptions. The offset number indicates how many columns to the right the description is located in the Table range.

Try this example. Enter the values and labels as shown in ranges A1..A5, A9..B13, and cell B1 of the figure below. Assign a range name to the area designated as the table by selecting MENU Range Name

	A	B	C
1	Part No.	Description	
2	7834	Nail	
3	1268	Widget	
4	3678	Adapter	
5	3452	Screw	
6			
7			
8			
9	Part No.	Description	
10	1268	Widget	
11	3452	Screw	
12	3678	Adapter	
13	7834	Nail	

Create (in 1-2-3, /Range Name Create), entering *table* as the range name, and specifying range A10..B13. Then enter the following formula in cell B2:

```
@VLOOKUP(A2,$table,1)
```

Copy cell B2 to range B3..B5. The formula in cell B2 locates in column A of *table* the part number stored in cell A2. The formula returns from *table* the part description that corresponds with the part number. Remember that the values in the first column of the Table range must be in ascending order. Also, make sure that you enter the exact part number, since the @VLOOKUP function interprets the values in the look-up column as numbers that define a set of brackets. For example, if you enter 7833 in cell A2, the formula in cell B2 returns *Adapter*.

This formula does not work in 1-2-3 Release 1A.

To find more information about @VLOOKUP, see "Your Table is Ready" in the April 1988 issue.

RANDOM PAGE BREAKS PRINTING A REPORT

Q. I prepare the monthly FTA budget for my children's school. The initial copy of the report prints perfectly. The second copy, however, contains several blank lines, beginning at about line 40. If I turn my printer on and off between printings, the printouts are satisfactory, but this procedure is annoying. Is there another solution?

K. Steven Brad
Chestrut Hill, Mass.

A. The problem you describe occurs when you don't use the Print Printer Align and Page (in *Symphony*, SERVICES Print Align and Page-Advance) commands properly. The printer determines where to place page breaks by counting the number of lines it prints. You should always select Align before Go to set the count to zero.

If you print 40 lines of information and then manually advance the paper to the top of the next page, the line counter remains set at 41. The next time you select Go, your printer will print 16 lines with top and bottom margins set to 2, then insert a page break. This places blank lines in the middle of a page. Rather than advance the paper by hand, select Page (in *Symphony*, Page-Advance) from the Print menu before printing a second

copy of your document. If this doesn't cure your problem, make sure your software's page-length setting matches the size of the paper you're using. Standard printer paper can fit exactly 66 lines on a page when the printer and software are set to print 6 lines per inch.

PROVIDING A SELECTIVE LISTING AND TOTAL

Q. I have a 1-2-3 spreadsheet that contains a list of items, their base prices, options that people can purchase along with the items, and the cost of each option. When someone makes a purchase, I need to produce a list of the selected options and the total cost of the items and options bought. How can I do this?

Charles L. Brooks
Phoenix, Ariz.

A. You can arrange your data as a database. Each row in the database is a record, and each column is a field. The fields contain the same type of information for all records. The following worksheet contains the base price and several options for a car. You can use the Data Query Extract command to provide the list of options selected by a customer.

	A	B	C
1	Select	Options	Cost
2	X	Base Price	\$12,000
3		A/C	\$800
4		Custom Mats	\$100
5		Dual Mirrors	\$50
6		Rear Wiper	\$200
7		Int. Wipers	\$250
8			
9	Select		
10	X		
11			
12	Total Cost.....		\$0
13			
14		Options	Cost

To see how this works, build the model as follows: Set the width of column B to 12, and enter the labels and values shown in range A1..C7 and in cell A12. Copy cell A1 to cell A9 and enter an X in cell A10. To format the values in column C, select /Range Format Currency (in *Symphony*, MENU Format Currency), enter 0, and specify range C2..C12. Copy the field names *Options* and *Cost* from range B1..C1 to cell B14. Now enter the formula @DSUM(A1..C7,A9..A10) in cell C12. You're ready to create the list of your customer's selected options.

Place a capital X in row 2 of column A

to select the base price of the automobile, then put an X in each row of the options the customer chooses. As you mark each option, the value in cell C12 adjusts to show a new total.

When you finish marking options, select /Data Query Input (in *Symphony*, MENU Query Settings Basic Database) and indicate range A1..C7. Select Criterion and indicate range A9..A10, then select Output and indicate range B14..C14. Now select Extract (in *Symphony*, Quit Quit Extract), and the selected options appear beneath the labels in range B14..C14, as in the figure below:

	A	B	C
1	Select	Options	Cost
2	X	Base Price	\$12,000
3		A/C	\$800
4		Custom Mats	\$100
5	X	Dual Mirrors	\$50
6		Rear Wiper	\$200
7	X	Int. Wipers	\$250
8			
9	Select		
10	X		
11			
12	Total Cost.....		\$13,100
13			
14		Options	Cost
15		Base Price	\$12,000
16		A/C	\$800
17		Dual Mirrors	\$50
18		Int. Wipers	\$250

HIDING AND DISPLAYING COLUMNS

Q. I am sometimes unable to display columns that I've hidden. I wonder if there is some problem with the software or if I'm doing something wrong. Several people in the company report similar problems.

J. D. Guest
Westinghouse Electrical Supply Co.
Birmingham, Ala.

A. To hide columns in 1-2-3, select /Worksheet Column Hide (in *Symphony*, MENU Width Hide), move the cell pointer to the column you wish to hide, and press Return. You may indicate several consecutive columns by pressing the period key to anchor the cell pointer and indicating all the columns required.

This is not available in 1-2-3 Release 1A or *Symphony* Release 1/1.01.

To redisplay hidden columns, select /Worksheet Column Display (in *Symphony*, MENU Width Display). All hidden columns will reappear, with asterisks next to their column letters. You may select consecutive columns to redisplay.

HARDWARE

CHANGING SCREEN COLORS

Q. Is it possible to select other color options for displaying the text, background, border, and highlighted areas of the spreadsheet screen? If so, please explain the steps required for setting the color options.

Markia Archuleta
Arlington, Va.

A. It isn't possible to change colors from within 1-2-3 or *Symphony*. However, there are both commercial and "freeware" products that can change the colors.

PARITY CHECKS DURING CALCULATIONS

Q. When I recalculate my spreadsheet, I occasionally receive a Parity Check error message. Strange characters appear above the top border of the spreadsheet, and I have to restart the computer because it locks up. I've already lost two worksheets because of this and would like to avoid losing a third. Can you help me?

Phyllis Garcia
Southington, Conn.

A. The Parity Check error message occurs when there's a problem with the memory in your computer. A Parity Check 1 error message refers to a problem involving the motherboard. A Parity Check 2 error message refers to a problem involving add-on memory boards.

Most Parity Check error messages result from a problem with a memory chip. If this is the case, you can usually identify the chip or chips causing the problem by using either the Diagnostics or Advanced Diagnostics disk that comes with your computer. However, Parity Check errors can also result from something other than a bad chip.

A Parity Check error message can indicate memory malfunction as a result of an improperly installed microprocessor chip. The chip may have a poor connection with one of the chip leads. This tends to occur when you move the computer, which may loosen the chip.

One final consideration: Static electricity can cause Parity Check errors. This can occur when you return to your computer and touch your keyboard. A surge of static electricity can travel from your hand to the keyboard. There are mats and sprays designed to stop the problem.

LOSING FILES

Q. I use a Zenith computer with a hard drive. While trying to retrieve a file recently, I received the error message *Part of file is missing*. To continue working, I restored the file from a backup copy I had created. I can understand why this would happen with a floppy disk, but why would this happen with a hard disk?

Kim A. Hoerig
Edwardsville, Ill.

A. In the August issue we addressed a similar situation. Problems involving reading from or writing to a floppy or hard disk are hardware- or disk-related. When you save a file, it isn't necessarily saved in a contiguous area on the disk. Rather, the computer saves the information in any space available. The file allocation table (FAT) maintains a record of the locations of the pieces of information. When the FAT is damaged, the computer can't locate all the pieces of information. This can result from a hardware problem or from using the DOS DISK-COPY command to copy an already corrupted disk.

When you receive the *Part of file is missing* error message, press the Escape key to clear the message. This may retrieve some of the damaged file. You may also try the File Combine Entire-File command to bring in the file. If either of these methods is successful, you should save the retrieved portion of the file on a new disk.

Your letter delivers an important message: Back up your data files on a regular basis. Hardware, although usually reliable, doesn't always warn you when problems are about to occur. Regularly backing up your data is the best safeguard against serious data loss.

SPREADSHEET-EMBEDDED
PRINTER-CONTROL STRINGS

Q. I have trouble getting my printer to print column headings in expanded mode. I retrieve my worksheet without any print-option settings and add blank rows for the different print size between rows that already contain text. Then I enter the required setup string into the cell above the range I want to print in this font. I can't get my column headings to print in expanded mode every time. Can you help?

Helen Phillips
Tonkin Inc.
Woodinville, Wash.

A. When using setup strings embedded in the spreadsheet, follow these steps: Move the cell pointer to the row above the range into which you want to insert a blank row. Select /Worksheet Insert Row (in *Symphony*, MENU Insert Rows) and press Return. Enter the setup string (in *Symphony*, initialization string) in the first column of the newly inserted row, making sure that this is the leftmost column of the Print range. The string will not function properly if entered in an area you specify as a border.

For example, Epson printers use the setup string \027W1 to print in expanded mode. Place the setup string in the leftmost column of the newly inserted row by entering the following:

```
\\027W1
```

The two split vertical bars tell the printer not to print the information directly following. Rather, that information serves as a printer setup string. Insert a new row after the data to be printed in expanded mode. Then enter a reset string to shut off the expanded printing.

CONTEST

FEBRUARY CONTEST RESULTS

In the February issue we asked users of 1-2-3 to submit the most effective technique for dividing a sentence entered as a long label into each of its individual words. We asked that the technique place each word of the sentence into its own cell. We also stipulated that it wasn't important where the sentence's punctuation marks fell.

For example, if you use the sentence *Spunky likes eating tomatoes*, from the following figure, your technique should place the word *likes* in cell A2, *eating* in cell A3, and *tomatoes* in cell A4.

	A	B	C	D
1	Spunky likes eating tomatoes.			
2				
3				
4				
5				
6				

Some readers used the Range Justify command to place each word into its own cell in column A. Then they used the Range Transpose command to rearrange the words into a single row of the worksheet. Transposing the words is use-

ful in many applications, but it wasn't necessary to solve the contest.

Some readers used the Data Parse command to convert the long label in cell A1 into individual entries in range A3..D3. This works, but it requires more steps than the winning solution.

Here is the winning technique: Set column A to a width of 1, 2, 3, or 4. Then place the cell pointer on cell A1, select /Range Justify, and press Return. A column width of 4 doesn't work if there are two consecutive one-letter words in a sentence.

One reader commented that he would recommend this technique if the Range Justify command didn't insert extra rows in the worksheet, which can result in the possible disruption of other data. His point is well taken. Don't use the Range Justify command in the manner we've described unless the column beneath the label you justify is blank.

The following readers submitted winning entries: Joel Blunt, Utica, Mich.; Diane Bumpass, Richmond, Va.; Terri J. Case, Hazelwood, Mo.; Julia Conner and Jennifer Roberson, Huntsville, Ala.; Cindy Diamond, Jenkintown, Pa.; Jeffrey Ellis, Camby, Ind.; Gene W. Ferguson, West Bend, Wis.; David Ray Givens, Columbus, Ohio; Helen Hartnett, Camillus, N.Y.; David Janiszewski, Minneapolis, Minn.; Thomas M. King, Richmond, Va.; Tom Masters, Charlotte, N.C.; Hannelore K. Merry, Lanham, Md.; Neale Minch, Urbana, Ill.; Michael W. Neff, Fort Worth, Tex.; Barrett R. Newlin, Modesto, Calif.; Michael Pearson, Washington, D.C.; Monica Premo, Fort Worth, Tex.; Greg Prescott, Alexandria, Va.; Robert Shacklett, Conroe, Tex.; Jeff Shadden, Sugar Land, Tex.; Amy Smith, Richmond, Va.; Robert Smith, Minneapolis, Minn.; Jon B. Soder, Proctor, Minn.; Cheryl Welch, Chappaqua, N.Y. ■

This material was prepared by Elizabeth A. Stahl and the Technical Editors, with the help of Lotus Product Support.

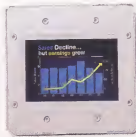
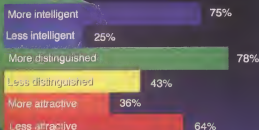
WRITE US

Do you have a question? We can't answer every letter, but if yours is selected, we'll publish it along with an answer or a request to other readers for advice. We'll pay \$25 for each letter we publish. Send your letters, including your address and daytime phone number, to: Q&A, LOTUS Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.

The state-of-the

Shareholder's View of Glasses

They make people look:



Quarter Sales Skyrocket

Why?



New Corporate Headquarters

Breaks Ground
Next Week

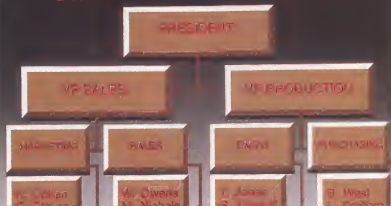


Profits Post a Gain

profits (millions)



Staff Added to Boost Sales



art of persuasion.

Today, having a good idea isn't good enough.

You also have to convince other people it's a good idea. And nothing gives your ideas more power and impact than DRAW APPLAUSE™ from Ashton-Tate®

It's the state-of-the-art presentation tool for IBM's PS/2 family and other 286-386 based computer systems. Because its amazing array of graphics capabilities takes you far beyond conventional business charts. To a whole new level of persuasion.

DRAW APPLAUSE lets you integrate graphics, text and data. Quickly and easily. To produce dynamic overheads. Impactful full-color slides. Impressive printed documents. Everything you need to create winning presentations.

Maybe that's why it was rated a "Best Buy" in the October 1988 issue of PC World.

DRAW APPLAUSE transforms dull numbers into powerful charts and graphs.

At the touch of a key or the click of a mouse. It also lets you integrate text and graphics in seconds. And you can quickly change type-faces, type sizes, and colors to create the exact visual effect you want.

DRAW APPLAUSE also gives you a ready-

to-use library of professionally-drawn, full color pictures and graphics images. Everything from a house to a hamburger.

Easy-to-use drawing tools allow you to customize charts and graphs. Or create your own original images. And bring them to life with a choice of over sixteen million colors.

DRAW APPLAUSE can also draw on other programs for input. Like Ashton-Tate's dBASE® software and PRESENTATION PACK™. You can even import DIF and CGM files.

DRAW APPLAUSE lets you project the most polished professional image possible. With 35mm color slides, overheads or hard copy you can produce yourself. Or we can process and ship to you. All that's required is a modem and our Ashton-Tate Graphics Service.*



For a free self-running demo* or information about the Ashton-Tate Graphics Service, just call 1-800-437-4329, ext. 0210.**

DRAW APPLAUSE from Ashton-Tate.

When it comes to persuasive presentations, it deserves a standing ovation.

 **ASHTON-TATE®**

*Requires EGA/VGA Color Monitor **In Colorado call (303) 749-4900, ext. 0210. Trademark/owner: DRAW APPLAUSE, dBASE, PRESENTATION PACK, Ashton-Tate Graphics Service, Ashton-Tate, Ashton-Tate Logo/Ashton-Tate Corporation. Other product names used herein are for identification purposes only and may be trademarks of their respective companies. © 1989 Ashton-Tate Corporation. All rights reserved.

MORE TIPS ON USING LOTUS PRODUCTS

1-2-3/SYMPHONY

FORMULA TO COMPUTE DAY OF THE WEEK

I must often determine the days of the week for various dates. To see how I do this, first use the Data Fill [in *Symphony*, Range Fill] command to enter a series of dates in range A1..A9. Enter @NOW for the start value, 1 for the step value, and 1000000 for the stop value. Set the width of column A to 10 and assign the Date 1 format to range A1..A9. Then enter the following formula in cell B1 and copy it to range B2..B9, as shown in the figure:

```
@CHOOSE(@MOD(A1,7),"Saturday",
"Sunday","Monday","Tuesday",
"Wednesday","Thursday","Friday")
```

	A	B	C
1	01-Feb-89	Wednesday	
2	02-Feb-89	Thursday	
3	03-Feb-89	Friday	
4	04-Feb-89	Saturday	
5	05-Feb-89	Sunday	
6	06-Feb-89	Monday	
7	07-Feb-89	Tuesday	
8	08-Feb-89	Wednesday	
9	09-Feb-89	Thursday	

Bret R. Nelson
City of El Mirage
El Mirage, Ariz.

This formula will not work in 1-2-3 Release 1A.

DISPLAYING DECIMALS WITHOUT LEADING ZERO

Calculating a batting average in baseball is elementary: Just divide the total number of hits by the total number of at bats. However, 1-2-3 displays the resulting answer with a leading zero before the decimal point, for example, 0.318. I want 1-2-3 to display the deci-

mal answer as a right-justified value in a nine-character cell, without the leading zero. Also, I wanted the formula to be updated automatically when I changed either the number of hits or at bats. The following formula does the job:

```
+ " &@RIGHT(@STRING
((hits/at.bats),3),4)
```

To see how this works, enter the number of hits, 113, in cell A1, and the number of at bats, 355, in cell B1. Name cell A1 *hits* and cell B1 *at.bats*. Then enter the formula above in cell C1 (note that there are five spaces between the quotation marks in the formula). The result will appear as .318 right-aligned, without the leading 0.

Dennis Taylor
Boulder, Co.

This method does not work in 1-2-3 Release 1A.

PLACEMENT OF CELL POINTER BEFORE COPYING

Using the Copy command in 1-2-3 and *Symphony* usually results in a lot of cell-pointer scrolling. Here's a technique that keeps scrolling to a minimum.

Suppose you want to copy the contents of cell A1 to cell A5. Normally, you place the cell pointer on cell A1 and select /Copy [in *Symphony*, MENU Copy], press Return to accept A1 as the cell to copy from, move the pointer to cell A5, and press Return again. After the copy procedure, the cell pointer returns to cell A1, the cell you copied from.

Try this method instead. Position the cell pointer at the destination cell, cell A5 in this example, before issuing the Copy command. Select /Copy [in *Symphony*, MENU Copy], and when the program asks where to copy from, either enter the

cell address or press the Escape key, which unanchors the cell pointer, highlight cell A1, and press Return. The cell pointer returns to cell A5. Press Return again to complete the Copy command.

The advantage of this method is that the cell pointer stays at the destination cell after you issue the Copy command. Since you probably modify the worksheet at the destination, this technique will help you spend less time scrolling through the worksheet.

James A. Rullo
The Penn Traffic Co.
Johnstown, Pa.

FINDING FIRST OR LAST DAY OF SUCCESSIVE MONTHS

The following formulas find either the last or the first day of each successive month, without using a lookup table.

To see how the formulas work, first enter the formula @DATE(88,1,1) in cell A1. In cell B1 enter @DATE(88,2,1)-1. Assign the Date 1 format to range A1..B2. To display the first of the next month, enter the following formula in cell A2:

```
@DATE(@IF(@MONTH(A1)=12,
@YEAR(A1)+1,@YEAR(A1)),
@IF(@MONTH(A1)=12,1,
@MONTH(A1)+1),1)
```

This formula evaluates to February 1, 1988. To display the last day of the next month; February 29, 1988, enter the following formula in cell B2:

```
@DATE(@IF(@MONTH(B1)=12,
@YEAR(B1)+1,@YEAR(B1)),
@IF(@MONTH(B1)=12,1,
@MONTH(B1)+2),1)-1
```

James Cubbin
Gerard Metal Craftsmen
Gardena, Calif.

Unfortunately, your formula returns ERR, beginning with the date for the last

GOOD IDEAS

day of December. Try using the following formulas:

Cell A2: $+A1+33-@DAY(A1+32)$

Cell B2: $+B1+33-@DAY(B1+33)$

To include dates for successive months in column A or B, copy the formulas in cell A2 or B2 farther down the column.

FORMULA TO REORDER NAME FIELD

I entered 200 names in 1-2-3 with a first initial and last name, as shown in column A of the figure below. Then I realized that I needed to sort the entries alphabetically by last name. Rather than retype all the names, I wrote a formula that put the last names first.

	A	B	C
1	Name	Name	
2	E. Ackerman	Ackerman, E.	
3	R. Berger	Berger, R.	
4	J. Arthur	Arthur, J.	
5	R. Bean	Bean, R.	
6	W. Austin	Austin, W.	
7	M. Allen	Allen, M.	

To see how it works, enter the labels shown above in column A and cell B1, then enter this formula in cell B2:

$@RIGHT(A2,@LENGTH(A2)-3)&$
 $","&@LEFT(A2,2)$

Copy this formula to range B3..B7. Select /Range Value [in Symphony, MENU Range Values], specify range B2..B7 as both the From and To ranges. Now you can sort the range correctly by last name.

Ed Fine
 FineSoft
 Stoughton, Mass.

This formula works only for names entered with a single initial followed by a period, a space, and the last name. See the Contest Results in the July 1987 issue for a more flexible formula. This formula will not work in 1-2-3 Release 1A.

USE @DSUM FOR NEGATIVE OR POSITIVE NUMBERS

A colleague asked if 1-2-3 could add only the positive or only the negative numbers in a column of mixed negative and positive numbers. I came up

with a method that uses 1-2-3's database statistical function, @DSUM.

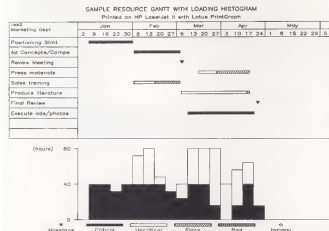
The @DSUM function relies on a selection criterion to sum only specific entries from a selected database column. The function has the syntax @DSUM(input,offset,criterion), where input identifies the database, offset identifies the column that contains entries to sum, and criterion identifies the Criterion range that determines the values to use in the summation.

	A	B	C
5		Crit	Crit
6		One	Two
7		0	0
8			
9	Sum of (+)	Sum of (-)	
10	25	-9	
11			
12	One	Two	
13	-5	5	
14	-5	1	
15	-25	30	
16	5	-9	
17	20	5	

To try out the formula, enter the labels as shown in rows 5, 6, 9, and 12 of the

Manage Your Projects in 1-2-3

Now you can manage projects and resources as easily as you handle other work in 1-2-3 or Symphony. Hot-link project and resource costs with spreadsheet budgets and ask "what if" with time as well as costs.



With PROJECT CALC (\$179.95) you create projects with simple 1-2-3-style menus. Then draw high quality Gantt timelines and PERT network diagrams, on-screen or via PrintGraph. And /Print formatted reports of dates and costs.

New PROJECT CALC/RESOURCES (\$279.95) adds resource Gantt and loading charts, resource reports, resource calendars, automatic resource leveling and resource-limited scheduling to help you track availability of people, facilities, etc.

"Easier to learn ... a very good value" -- InfoWorld.

Try either one today on our 30-day money-back guarantee and see how quickly you can start managing real projects. Both add-ins work with 1-2-3 Release 2 and 2.2 or Symphony 1.1, 1.2 and 2.0, support CGA, EGA, VGA or Hercules graphics, and use 60K to 160K add-in memory.

REPORT CARD

1-2-3 ADD-INS PROJECT CALC VERSION 1.10

Criterion	(Weighting)	Score
Performance	(400)	Good
Documentation	(80)	Very Good
Ease of learning	(40)	Very Good
Ease of use	(120)	Good
Error handling	(80)	Good
Support		
Support policies	(40)	Very Good
Technical support	(40)	Very Good
Value	(200)	Very Good
Final score		7.0

Call 24 Hrs (800) 451-0303 Ext 55
 (Dealer inquiries Ext 42)

**FRONTLINE
 SYSTEMS**

140 University Avenue #100
 Palo Alto, California 94301
 Outside U.S.: 916-677-7171

GOOD IDEAS

sample figure. Enter the values in range A13..B17. Assign the name *input* to range A12..B17. Enter the criterion formulas +A13>=0 in cell A7 and +B13<0 in cell B7.

To find the sum of all positive numbers in the first column, enter the formula @DSUM(input,0,A6..A7) in cell A10. To find the sum of all negative numbers in the second column, enter @DSUM(input,1,B6..B7) in cell B10.

These functions automatically update anytime you change the values in the Database range. If you add more values, be sure to redefine *input* to include the new values.

Dr. Ronald W. Kilgore
University of Tennessee at Martin
Martin, Tenn.

EDITING WITH QUERY FIND

In a *Symphony* SHEET window, you can't edit a record found by the MENU Query Find command. Use the following technique to get around this problem.

When the Query Find command locates the record you want to edit, hold down the Shift key and press the GOTO key. This results in an error condition. Press the Escape key to clear the error, and the cell pointer remains on the selected row for editing. To search for more matching records to edit, repeat the Query Find command and press the DownArrow key to highlight the next match. Press Shift-GOTO to cause an error, and edit the record the same way.

Leslie G. Erickson
Detroit News
Ulrich, Mich.

When you use the Data Query Find command in 1-2-3 Release 2/2.01, the pointer lands on the first field of the first matching record. To edit that cell, make the desired changes, then press Return. To edit other fields in the record, press the RightArrow key until the cursor is on the desired cell, make your changes, and press Return.

HARDWARE

USING WASTED LABELS FOR RETURN ADDRESS

Every time I printed labels, I wasted the first four labels trying to get the label sheet up past the printhead and onto the tractor-feed sprockets. I've now

found a way to make use of those first four labels.

At the end of each mailing list, I include my return mailing address so that it prints on the last four labels. It's always handy to have a few return-address labels. The next time I print labels, I line up the printhead with the first blank label on the sheet—directly beneath the labels that contain my address.

Be careful if you try this, however. Before you roll back a page of adhesive labels to remove the last page from your printer, be sure to turn off the printer, move the printhead out of the way, and gently pull forward the metal guide at the bottom of the platen. If a label were to peel off its backing and stick to the platen, it would be very difficult to remove.

Peter C. Bennett
Great Scott Computer Consulting
Cortland, NY

PARALLEL PORT PROBLEM ON COMPAQ 286/386

My Hewlett-Packard Deskjet printer couldn't print a 1-2-3 spreadsheet from my Compaq Deskpro 286 computer. I had installed the driver I received from Hewlett-Packard and selected the correct printer name and interface from 1-2-3's Worksheet Global Default settings. Yet when I tried to print a file from any 1-2-3 spreadsheet, I got a flashing ERROR. Also, when I tried to print by using the PrintScreen key, nothing happened. Later my dealer gave me the following solution.

If your Compaq Deskpro 386/20e or 386s has a parallel port on its system board and it has an additional parallel port on its multipurpose controller adapter, you will not be able to print from either parallel port.

To correct the problem, you must disable the controller adapter parallel port. To do so, turn off your computer, remove your PC cover, and modify the adapter as follows: If the adapter has a four-switch block, set switch 2 to the Off position; if the adapter has a six-switch block, as newer adapters often do, set switch 6 to the On position. Now connect your printer to the parallel port on the system board. Your printer will now print, assuming that your printer cable isn't defective.

Morris Kagan
Toronto, Canada

Compaq confirms that the only way to resume printing is to disable the parallel port in the multipurpose controller adapter.

REVISITED

RECALCULATING JUST ONE CELL

Charles Miwa [September] showed how to recalculate a single cell with manual recalculation. You simply put the cell in Edit mode and press Return. You can do this even more easily by automating the process with the one-line macro {EDIT}~.

This method has one drawback, however. Whether you use the macro or press the keys manually, you can end up with erroneous results if the formula you recalculate relies on the results of other formulas in the spreadsheet. Don't trust a formula's value until you recalculate the entire worksheet.

Wade A. Wallinger
Austin, Tex.

ADJUST THE LINE LENGTH ON YOUR IBM QUIETWRITER

In the September issue, Karen Wright told you to set DIP switch 3 on an IBM Quietwriter to the On position in order to print wider than 8 inches on 14-inch-wide paper.

I recently had the same problem with DIP switch 3 set to the On position, but I found another way to correct it. I set the right margin to 240 and use the setup string 027015. This code changes the printer's line length to 13.2 inches. You can include this setup string as part of any other string you're using.

Charles R. Kahn
Indianapolis, Ind.

NAVIGATING SEVERAL DIRECTORY LEVELS

I'd like to add an improvement to Arthur Naman's technique [October]. To move down one subdirectory level, he suggested using a single period followed by a backslash and the second level subdirectory name: \DIRNAME. Since the program knows the current directory, you need to indicate only the subdirectory name you wish to use.

If you're using the directory \FILES \PURCHASE and you want to change to

GOOD IDEAS

the directory \FILES\PURCHASE\ORDERS, select /File Directory and enter *orders*. You do not need to precede the directory name with a period and a backslash. This technique does not work in *Symphony*.

Suzanne Kelly
St. Louis, Mo.

WHEN CONTROL-BREAK DOESN'T STOP A MACRO

As Jim Mullen [May 1988] and U. Erkmem [July] both noted, pressing the Control-Break key combination doesn't always stop a macro's endless loop. If you have this problem, try holding down the Control key and pressing the C and Break keys at the same time.

Jill Barnhart
Owego, N.Y.

HOW TO AVOID FORMAT COMMAND DISASTERS

I'd like to suggest some improvements to your recommendation concerning DOS's FORMAT command [December].

You suggested renaming the file FORMAT.COM to KILLDISK.COM, then using a file named FORMAT.BAT to make sure that you only format floppy disks in drive A. Your approach works, but it doesn't let you use parameters such as /S to transfer the system files, /V to add a volume label, and so on. Use the following commands in your FORMAT.BAT file to allow for any drives or parameters you normally use:

```
echo off
cls
IF %1 = a: GOTO BYPASS
IF %1 = a/s GOTO BYPASS
IF %1 = a/v GOTO BYPASS
IF %1 = a/s/v GOTO BYPASS
IF %1 = a/4 GOTO BYPASS
ECHO.
ECHO. ***** ILLEGAL drive entry
ECHO. in FORMAT request *****
GOTO END
:BYPASS
killdisk %1
:END
```

The number of IF statements you add will depend on your DOS version, the parameters you normally use, and the

number of drives you have. If you enter *format* and specify a drive other than A at the DOS prompt, you'll get the message ***** ILLEGAL drive entry in FORMAT request *****.

Bob Farland
Hampton, Va.

To create the file named FORMAT.BAT, enter copy con:format.bat at the DOS prompt. Then type each line of the instructions as we showed them and press Return at the end of each line. After entering the last line, press the F6 key, then press Return. DOS should respond with the message 1 File(s) copied.

This material was prepared by Subbadra Mat-tai and the Technical Editors, with the help of the Lotus Product Support staff.

WRITE US

Do you have a favorite technique or way of using your Lotus products or of keeping your hardware and software on speaking terms? Share it! We'll send you \$25 if we print your letter. Send them to: Good Ideas, LOTUS Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.

STORE YOUR LOTUS DATA FOR YEARS...



In handsome library cases designed expressly for *LOTUS* subscribers. Cases are deep red with embossed silver lettering. Each is sturdily constructed and holds one year (12 issues) of *LOTUS*.

1 for \$7.95, 3 for \$21.95 or
6 for \$39.95.

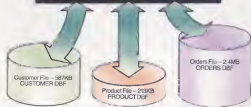
(Plus \$1 per case for postage and handling within the U.S., or \$2.50 per case shipped to Canada and beyond. PA residents add 6% sales tax.)

MAIL TO:
Jesse Jones Industries
PO Box 1165, Kendall Square
Cambridge, MA 02142

Please send me _____ *LOTUS* library cases. Enclosed is my check or money order payable to Jesse Jones (in U.S. currency) for \$_____, or charge my ☐ VISA ☐ MasterCard ☐ AMEX.

NAME _____ SIGNATURE _____
CARD NO. _____ EXPIRATION DATE _____
ADDRESS (Street address only) _____
CITY _____ STATE _____ ZIP _____

Satisfaction guaranteed by Jesse Jones Industries or money refunded. Please allow up to six weeks for delivery.



dBASE Power for 1-2-3

@BASE™ is a powerful add-in for 1-2-3® that lets you build big database applications without using lots of worksheet memory. @BASE™ stores data on disk in dBASE format. PC Week says "The king of the crowded forest of Lotus 1-2-3 database add-ins is unquestionably @BASE™." From the makers of SeeMORE, UltraVision and Look&Link.

personix

800-445-3311
508-897-1575

READY-TO-RUN ACCOUNTING FOR 1-2-3

A spreadsheet-based system that's capable but slow

BY STEPHEN L. NELSON

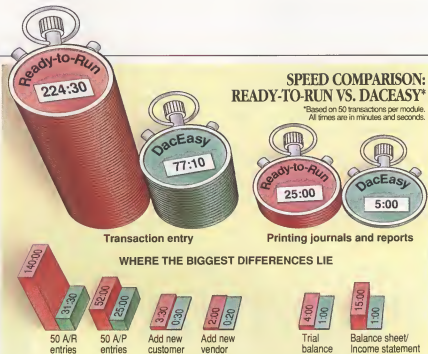
If your business entails several hundred monthly transactions—invoices, payroll checks, bill payments, and journal entries—and if you're familiar with double-entry bookkeeping, you can use *Ready-to-Run Accounting* to automate your accounting.

The program is a set of macro-driven 1-2-3 templates that forms a complete accounting system. You need 1-2-3 to run the program, but you don't need to know anything more about 1-2-3 than how to start it. *Ready-to-Run* is driven entirely by its own menus.

The program offers separate modules for general ledger, accounts receivable, accounts payable, inventory/order entry, and payroll. The scope of *Ready-to-Run's* accounting features is roughly the same as that of the two best-selling, comparably priced programs, *DacEasy Accounting* Version 3.0 (\$99.95 alone or \$199.90 with *DacEasy Payroll*, Dac Software, Dallas) and *Peachtree Accounting* (\$199, Peachtree Software, Norcross, Ga.). In comparison with these programs, *Ready-to-Run* has some important pluses and minuses.

The pluses: Of the three programs, *Ready-to-Run* is the only one that offers tax-saving LIFO (last-in-first-out) and FIFO (first-in-first-out) inventory assumptions. And if you're a 1-2-3 macro expert or you retain someone who is, you can modify *Ready-to-Run* to more closely suit your needs. But even the most skilled macro programmer should study the program carefully or contact the publisher before attempting any changes.

The minuses: *Ready-to-Run* offers less protection than the other programs against costly data errors and fraudulent



transactions. And compared with the stand-alone programs, *Ready-to-Run* is very slow.

From a cost standpoint, the program will probably appeal to you only if you already own 1-2-3. The cost of acquiring 1-2-3 (\$495) strictly to run *Ready-to-Run* makes this accounting system uncompetitive unless you need to take advantage of *Ready-to-Run's* programmability.

SPECIAL FUNCTIONS

Ready-to-Run's flexibility in inventory accounting could be important to you. The LIFO (last-in-first-out) approach assumes that the last, or most recent, inventory items you purchase are the first to sell. The FIFO (first-in-first-out) approach assumes that the first inventory items you purchase are the first to sell. If you're in an industry where prices continually rise, LIFO will yield a lower—and usually fairer—estimate of your accounting profit, and as a result, you'll pay a lower amount of income tax. Conversely, you

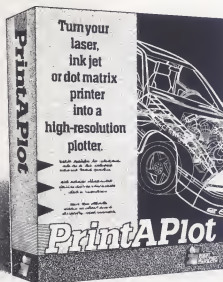
can use the FIFO method of inventory accounting, if that's the approach that your accountant recommends.

Ready-to-Run has a special way of handling invoices. The program automatically selects invoices that are due for payment, which makes it easy to pay bills on time. In addition, if a vendor offers a discount for early payment, the program selects these invoices in time for you to earn the discount and automatically calculates the discounted amount. In this way, the program all but forces you to get the best price for your purchase.

Ready-to-Run lacks some of the functions that you might find in a stand-alone program. All three programs let you create annual budgets for financial planning. But *Ready-to-Run* doesn't allow you to create monthly budgets as you can in *Peachtree Accounting*. That makes it more difficult to monitor your performance and adjust your annual budget when necessary. Also, unlike *DacEasy Accounting*, *Ready-to-Run* doesn't create

Stephen L. Nelson is a consultant in Redmond, Wash., and author of Using DacEasy Accounting (Que Corp., 1988).

Finally, a high-speed, high-resolution plotter for under \$200.



Imagine printing plotter-quality high-resolution graphics on your printer. Faster and with better text quality than if you bought a plotter costing thousands of dollars.

No matter what graphics software you use, PrintAPlot™ produces the highest possible resolution from any type of printer. 300 dpi for laser and ink-jet printers, 360 x 360 for 24-pin dot-matrix printers. PrintAPlot is one of the few software packages that can take advantage of the full capabilities of 24-wire printers.

PrintAPlot's special data compression techniques improve printing speed up to 10 times. Because of the inherent efficiency of raster-scan vs. vector-drawing printing, the more complicated the drawing, the greater the improvement in speed. You can produce more drawings in less time. And since you can queue any num-

ber of files for unattended printing, your productivity will increase dramatically.

Data compression also allows larger, higher-resolution images to be produced without adding expensive memory.

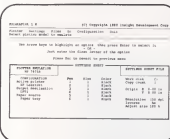
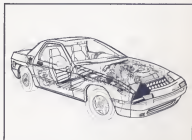
PrintAPlot has a host of other features, too. Drawings can be enlarged up to 150% or reduced to 1% of full size. Text printing is excellent. Color simulation capability renders colors in varying shades of gray on single-color printers.

And best of all, PrintAPlot is easy to use. You select pen widths, shading or colors, etc. simply and quickly from a friendly Lotus-like menu.

To order your copy of PrintAPlot, visit your local dealer or call (800) 825-4115.

30-DAY GUARANTEE.

If you're not satisfied after 30 days, return for a full refund.



REVIEWS

purchase orders or returns, so you have no easy way of recording the terms, prices, and quantities of your purchases.

Furthermore, unlike *Peachtree*, *Ready-to-Run* doesn't prepare debt-amortization or asset-depreciation schedules, so you'll have to prepare those schedules yourself in 1-2-3. @Library Volume 1 (\$79.95, IRG, Setauket, N.Y.), a 1-2-3 add-in, contains special @functions that enable you to calculate depreciation and amortization without creating a schedule. You can enter these @functions directly into *Ready-to-Run*'s worksheets, but they'll cost you some memory—20K for the 1-2-3 add-in manager and about 5K for the @functions—in addition to the price of the program.

As noted, it's possible to revise *Ready-to-Run*'s macros to suit your needs. For example, although none of these three programs gives you much control over the layout of your invoices, you can modify *Ready-to-Run*'s macros to make your invoices appear exactly as you like. And while none of these programs produces a cash flow statement automatically, you can have *Ready-to-Run* produce one by adding a macro.

Several of the users I spoke with had customized *Ready-to-Run* to collect data from their own financial worksheets. If you've designed an application to calculate asset depreciation, job costs, or other financial data, you can customize *Ready-to-Run* to combine that data from other worksheets. While most stand-alone accounting programs let you export data to a spreadsheet, very few let you dump spreadsheet data directly into your accounting system in this way.

But don't try to modify *Ready-to-Run*'s macro code unless you're fluent in 1-2-3's macro language. The program's macros are extremely complex, and the manual offers little instruction on how to edit them. Furthermore, Manusoft Corp., the publisher, will not provide support for problems resulting from your own customization. The publisher will customize the program for a fee, however. You can also refer customization work to one of Manusoft's several value-added resellers, although Manusoft will support only its own modifications.

SPEED AND MEMORY

Ready-to-Run's slowness is typical of a large, macro-driven application. Its sluggishness, combined with its relatively large memory overhead, can effectively

limit you to several hundred monthly transactions—even though the publisher recommends the program for as many as 1,000 monthly transactions.

In my tests of *Ready-to-Run* and *DacEasy*, I processed the same amount of data—roughly 50 transactions per module (see the Speed Comparison chart). It took three times as long to enter the data into *Ready-to-Run*: 224 minutes 30 seconds versus 77 minutes 10 seconds for *DacEasy*. *Ready-to-Run* also printed reports much more slowly. It took *Ready-to-Run* 15 minutes to produce the balance sheet and income statement that *DacEasy* produced in 1 minute.

My system did not run out of memory during my tests, but some users I spoke

with experienced memory limitations when working with several hundred transactions per month per module. Even having expanded memory may not help much: One user reported running out of conventional memory before running out of expanded memory. Most stand-alone accounting packages store only a few transactions in memory at a time and are therefore less likely to run into memory problems.

LESS PROTECTION

Because *Ready-to-Run* stores your accounting data in 1-2-3 worksheet files, you have access to that data through 1-2-3. This makes it easy to manipulate or graph your data. To do the same with

FEATURE COMPARISON			
	Ready-to-Run	DacEasy	Peachtree ¹
General Ledger (G/L)			
Audit trails of all transactions	Yes	Yes	Yes
Yearly budgets allowed	Yes	Yes	Yes
Monthly budgets allowed	No	No	Yes
Income statements produced	Yes	Yes	Yes
Balance sheets produced	Yes	Yes	Yes
Cash flow statements produced	No	No ²	No ²
Integrated with other modules/functions	Yes	Yes	Yes
Report writer allowing customized reports	Yes	Yes	Yes
Amortization schedules/depreciation schedules	No	No	Yes
Accounts Payable (A/P)			
Check writing	Yes	Yes	Yes
Automated payment selection	Yes	No	Yes
Discounts taken automatically	Yes	No	Yes
Vendor master with historical data	No	Yes	Yes
Aging of A/P	Yes	Yes	Yes
Audit trails of all transactions	Yes	Yes	Yes
Accounts Receivable (A/R) and Billing			
Invoice and sales-return generation	Yes	Yes	Yes
Finance-charge calculation	Yes	Yes	Yes
Customer master file with historical data	Yes	Yes	Yes
Aging of A/R	Yes	Yes	Yes
Audit trails of all transactions	Yes	Yes	Yes
On-line application of collections easy	Yes	Yes	Yes
Customizable invoices	No	Yes	No
Sales tax info collected/reported for multiple locations	No	No	Yes
Purchasing and Inventory			
Perpetual inventory system	Yes	Yes	Yes
Inventory levels monitored for reorder	Yes	Yes	Yes
Provides LIFO and FIFO inventory costing	Yes	No	No
Purchasing of noninventory items easy	Yes	Yes	Yes
Purchase orders and returns generated	No	Yes	No
Inventory master with historical data	Yes	Yes	Yes

¹Provides two modules not included in this list: job costing and fixed assets.

²Can create a cash flow statement from other customized reports.

New For
LOTUS
Users!

PC LIBRARIAN™

Gives Your Hard Disk an Instant Spring Cleaning

PC LIBRARIAN clears your hard drive of inactive PC files while creating a file catalog for instant retrieval.

Think of all those inactive PC files taking up precious storage space on your hard disk. "Someday" you're going to clean house and reclaim that space. Why not let PC LIBRARIAN do the job for you **today**?

Unclutters Your Hard Disk

PC LIBRARIAN lets you remove inactive files from your hard disk by transferring them to the archiving medium of your choice — floppies, second HD, cartridge, tape, mainframe or LAN.

Don't confuse PC LIBRARIAN with "backing up" which merely duplicates old files, leaving your hard disk as cluttered as ever. PC LIBRARIAN sweeps your hard drive clear of inactive files without depriving you of access to them. How?

Organizes Inactive Files

PC LIBRARIAN creates a file catalog that remains on your hard drive. This on-line catalog

offers you up to 59 characters to accurately describe each archived file [ideal for common word processing, spreadsheet and data base files]. Not only can you now quickly search and locate old files, you can even preview a file **beforehand** to verify that it's the one you want to archive or retrieve.

You also enjoy the convenience of compression and the security of encryption.

Great News for LAN Users

PC LIBRARIAN is ideal for 3 Com, LAN Manager and Novell networks. Individual work stations can periodically "houseclean" by archiving inactive files onto the central file server for off-line storage.

Special Introductory Discount

PC LIBRARIAN can now be yours for only \$69 — that's a full \$30 off the regular price! Try it for 30 days. If you're not delighted with all that new hard disk storage space suddenly at your disposal, simply return it for a full refund.

To order, call toll free **800-892-0007** (in Virginia or Canada, call **703-556-0007**). FAX **703-734-3368**. Major credit cards accepted. Or fill out the coupon.



PC
LIBRARIAN

(800) 892-0007

[703] 556-0007 Virginia or Canada

United Software Security, Inc.
8133 Leesburg Pike, Suite 800 Vienna, VA 22182

I'd like to try PC LIBRARIAN for 30 days at the discount price of \$69.
Please ship _____ (copies) to fit (check one) ☐ 3 1/2" disk ☐ 5 1/4" disk ☐.

Name _____

Address _____ Phone (____) _____

City _____ State _____ Zip _____

MasterCard ☐ VISA ☐ Am. Ex. ☐ # _____ Exp. Date: _____

System Requirements: To use PC LIBRARIAN, you must have an IBM PC/XT/AT/PS2 or 100% compatible computer; MS/DOS or PC/DOS versions 2.1 or later; monochrome or color display; and a minimum of 512 KB of internal memory.

FINALLY!

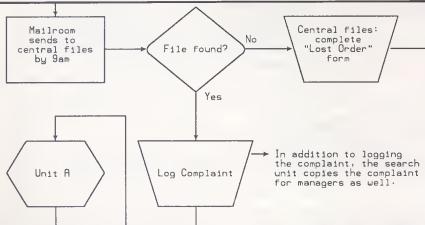
EASYFLOW

An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work. **EASYFLOW** is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With it you can quickly compose charts. More important, you can easily modify charts so they are always up to date.

- ▶ **Automatic:** Fully automatic text centering within shapes, both horizontally and vertically. Fully automatic line routing & re-routing.
- ▶ **Fast:** Written in assembly language for speed.
- ▶ **Large:** Charts up to 417 columns wide by 225 lines high. Chart too large for your printer? **EASYFLOW** automatically breaks the chart up & prints it in page size pieces.
- ▶ **Standard:** All standard flowcharting shapes included. Custom shapes can be ordered.
- ▶ **User friendly:** Don't take our word for it. PC Magazine says "**EASYFLOW** lives up to its name. It's hard to imagine any easier and more flexible way to produce basic and even complex flowcharts". [March 10th 1987 issue, page 278.]
- ▶ **Mouse:** Optional but fully supported.
- ▶ **It prints:** On most popular matrix printers including IBM, Epson, Toshiba, HP LaserJet, LaserJet-Plus and many others.
- ▶ **It plots:** On HP7440, 7475, 7550, 7570, 7585B and compatible plotters.
- ▶ **It works:** We are contractually prevented from mentioning the name of the "big eight" accounting firm that purchased a world-wide site license, but we can tell you that they spent months evaluating all available flowcharting packages before choosing **EASYFLOW**.
- ▶ **Rush delivery:** Order by noon today (eastern time) and you'll have it tomorrow. Rush delivery charge is \$10.50 (instead of \$2.00) and is available only to continental USA and Canada.
- ▶ **Documented:** 100 page manual plus over 150 screens of context sensitive help.

EASYFLOW works on IBM PC's, IBM PS/2 and compatibles. Requires 384 K memory, DOS 2.0 or higher and an IBM CGA/EGA/VGA or Hercules monochrome compatible adapter card.

Order direct for only **\$149.95** + \$2.00 S&H (USA/Canada), \$10.00 (foreign). Payment by M.O., cheque, VISA, Mastercard or Company P.O.



The chart fragment above was produced on an HP LaserJet-Plus and is actual size and unretouched. Publication quality charts like this can be produced using only minutes of preparation time and seconds of print time.

HavenTree Software Limited
PO Box 1093-E
Thousand Island Park, NY 13692

Order Desk: 1-800-267-0668
Information: (613) 544-6035 ext 83
Telefax(G3): (613) 544-9632

REVIEWS

data stored in *Peacetime* or *DacEasy*, you'll need to process that data with another program. Unfortunately, if you do use 1-2-3 interactively with your accounting files, you can also contaminate your

YOU CAN CUSTOMIZE READY-TO-RUN TO COLLECT DATA AUTOMATICALLY FROM YOUR OWN FINANCIAL WORKSHEETS.

data or erase it accidentally, which is almost impossible to do in most stand-alone accounting programs.

Unlike many comparably priced accounting programs, *Ready-to-Run* provides no way for you to introduce appropriate controls over the use of the program. For example, with many accounting programs you can reserve for yourself the ability to read and edit your vendor file and enable your bookkeeper to only read that file. This would allow your bookkeeper to make necessary payments but would make it harder for an employee to embezzle funds by transacting business with a fictitious vendor.

You can use 1-2-3's password protection to limit access to data stored in *Ready-to-Run*, but this provides only a partial solution because once others know the password to a file, they can read it or edit it any way they like. Naturally, you can exert controls outside of the system, such as granting only one person access to the computer. But it's more effective to tap the computer's power for this purpose, as other, stand-alone products do. ■

IN BRIEF

Ready-to-Run Accounting Version 2.11. Manusoft Corp., 8570 West Washington Blvd., Culver City, CA 90232; 800-292-6123, in Calif. 213-559-1564. Requires DOS 2.0 or higher, any release of 1-2-3, 384K of RAM, and two floppy-disk drives or a hard disk. Released 1/88. \$199.95. Individual modules for general ledger, accounts receivable, accounts payable, payroll, and inventory/order entry are available for \$69.95. Free unlimited support; 30-day, money-back guarantee; less shipping charges; \$10 restocking fee if package opened.

USING QUE®



Discover the key to 1-2-3 productivity—with books from Que! Whether you need an easy-to-follow tutorial or a collection of power techniques, you will get the most from 1-2-3 by using Que books.

Join the millions of users who know that Que publishes the most informative, best-written personal computer books available. Now *you* can advance beyond the software manuals into a new dimension of power and productivity—by using Que books!

Look for Que books in more than 7,500 bookstores and computer stores.

Call 1-800-428-5331, ext. LOT1, for a free catalog of Que books.

que®

How to tip the balance in your favor.

Introducing
one heavy-duty PC.



Processor: 80386

Speed: 25 Mhz

Memory: 2 Mb-18 Mb RAM

Total Slots: 8



PW² Series 300/10 80286 10 Mhz



PW² Series 500/12 80286 12 Mhz



PW² Series 800/20 80386 20 Mhz

Getting more from personal computing doesn't mean more PCs. It means balancing the right PCs with the right business solutions and connections.

PRESENTING THE RIGHT PC Our new PW² Series 800/25A starts with 25Mhz, 80386 desktop muscle. Up to 640 Mb of mass storage, cache memory, with tape back-up and VGA displays. And Windows/386 with MS-DOS to give you both ease of use and multi-tasking flexibility.

THE RIGHT BUSINESS SOLUTION The best solutions are created with specific businesses in mind. So we offer you our dealer network to bring you custom-tailored software. A free book tells you who and where you can get everything from Distribu-

tion inventory control to Healthcare payroll applications.

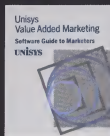
THE RIGHT CONNECTIONS Unisys is an industry leader in networking. And that includes our PCs. With our USERNET², you can choose from Ethernet, Token Ring or simple twisted-pair wiring to communicate with minis, mainframes, or other PCs.

And don't worry. Despite all the added power, these are true PCs. So you can run MS-DOS, XENIX, and MS-OS/2 operating systems.

Call today for your FREE copy of the Unisys Guide to Marketers. Find out more about the new PW² 800/25A. And discover how one heavy-duty PC can tip the balance in your favor. Call 1-800-547-8362.

UNISYS AND YOU.
The power of²

USERNET² is a registered trademark of Unisys Corporation. PW² is a trademark of Unisys Corporation. MS-OS/2, MS-DOS, and XENIX are registered trademarks of Microsoft Corporation. ©1989 Unisys Corporation



UNISYS

PW² Series 850/16 80386 16 Mhz

DESKJET VS. BUBBLEJET

Either could be the next best thing to a laser printer.

BY MARC DAVIDSON

If you need better black-and-white output than you can get from a letter-quality dot-matrix printer but can't afford to buy a laser printer, an ink-jet printer may suit your needs and your budget. Two such printers, the Hewlett-Packard DeskJet (\$995) and the Canon BubbleJet (\$1,095), deliver near-laser-quality text and graphics output for hundreds of dollars less than you'd pay for the more popular laser printers.

Which printer is best for you depends partly on the software that you use. Because these printers are relatively new, your software may not include a specific printer driver for either printer. To get around this problem, Canon has made the BubbleJet compatible with the popular IBM Proprinter, and Hewlett-Packard has made the DeskJet nearly compatible with its LaserJet. If your software has a printer driver for the IBM Proprinter, you can use it to print with the BubbleJet. If your software has a driver for the HP

LaserJet, in most cases you can use it to get satisfactory results from the DeskJet.

Your graphics software determines the speed and quality with which these printers produce graphics. One example is worth noting: If you print graphics with 1-2-3's or *Symphony's* PrintGraph program, the BubbleJet will produce higher-quality output than the DeskJet but will take much more time to do so.

Other factors may govern your choice. The DeskJet is faster than the BubbleJet for most purposes, but the BubbleJet can print some of your wider spreadsheets faster. Also, the DeskJet's output is more likely to smudge than the BubbleJet's.

SPREADSHEETS AND TEXT

In my tests the DeskJet took 1 minute 20 seconds to print a two-page spreadsheet in draft quality; the BubbleJet took 1 minute 35 seconds to do the same work. When printing the same spreadsheet in high quality, the DeskJet took 1 minute 39 seconds; the BubbleJet, 2 minutes 2 seconds.

The BubbleJet's built-in Courier font is

slightly sharper than the DeskJet's. If you want to use another font with either printer, you must buy an optional font cartridge. Hewlett-Packard offers DeskJet cartridges that print in Times Roman and Helvetica, two fonts common in laser printers, for \$75 or \$95, depending on the cartridge. BubbleJet cartridges are limited to standard dot-matrix and daisy-wheel fonts, such as Gothic or Orator. They go for \$95 each.

If you typically print spreadsheets that are too wide to fit across an 8½-inch-wide sheet of paper, the BubbleJet offers you an extra convenience. You can print along the 11-inch edge of a standard piece of paper by simply turning the paper 90 degrees in the sheet feeder. The printer still prints at the same speed. If you use the optional tractor-feed mechanism, you can print on paper up to 16 inches wide.

Like an HP laser printer, the DeskJet lets you print wider spreadsheets in landscape mode—sideways along the page—but to do so you need a cartridge that costs \$95. You also have to sacrifice

Marc Davidson is a free-lance writer and a frequent contributor to LOTUS.



FRED UNICH

speed. The DeskJet needed 3 minutes 34 seconds to print my test worksheet in landscape mode—more than twice as much time as it took to print the worksheet on a normally oriented page.

GRAPHICS

In my tests it took the DeskJet 1 minute 7 seconds to print a draft-quality version of a graph using *Harvard Graphics*; it took

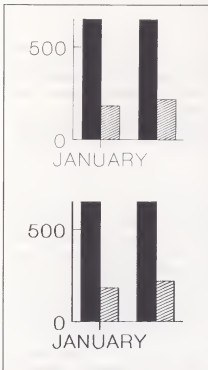


FIGURE 1. A chart printed with *Harvard Graphics* on the Hewlett-Packard DeskJet (top) and the Canon BubbleJet (bottom). The DeskJet graph boasts finer lines, smoother curves, and less jagged diagonal lines.

the BubbleJet 1 minute 21 seconds to print the same graph. To print a high-quality version of the graph, it took the DeskJet 3 minutes 59 seconds and the BubbleJet, 5 minutes even. In this case the DeskJet's high-quality output is noticeably sharper than the BubbleJet's (see figure 1).

Printing with the PrintGraph program that comes with *1-2-3* and *Symphony*, however, yields different results. In my tests with PrintGraph, DeskJet took 52 seconds to print a graph in draft quality. The BubbleJet took 1 minute 40 seconds—more than twice as much time. When printing the same graph in high quality, the DeskJet took 56 seconds—about the same amount of time as in draft mode—while the BubbleJet slowed to 8 minutes 30 seconds.

In this case, however, the BubbleJet's high-quality output is dramatically sharper than the DeskJet's (see figure 2). The BubbleJet's lines are straighter and its text more readable. In fact, when printing graphs with PrintGraph, the DeskJet's high-quality output is no sharper than draft quality—it's just darker.

The variation in the quality of graphic output stems from differences in printer resolutions and the ability of your graphics program to take advantage of those resolutions. The DeskJet can print 75, 150, or 300 dots per inch. The BubbleJet can print 60, 120, 180, 240, or 360 dpi. *Harvard Graphics* can use the DeskJet's best resolution, 300 dpi, but can print at no sharper than 240 dpi on the BubbleJet. PrintGraph can use only the DeskJet's worst resolution, 75 dpi, but can print at 240 dpi on the BubbleJet.

PRACTICALITY

No matter what resolution you get from the DeskJet, its easily smudged ink poses a constant threat to the appearance of your printouts. If you wait 30 seconds or so after printing, you can usually handle your printout without smudging. But on a hot, humid day, when your hands are never completely dry, the DeskJet's output can smudge even if it's several weeks old. The BubbleJet's output starts dry and stays that way. If durability is important to you, as it is if you print lots of contracts or legal documents, the BubbleJet is the better printer for you.

Unlike dot-matrix and daisy-wheel printers, which print by striking an inked ribbon, ink-jet printers print by spraying ink onto the paper. As a result, the DeskJet and the BubbleJet are very quiet. In both, the mechanism that feeds the paper into the printer makes more noise than the printer itself.

Although clogging can be a problem for some ink-jet printers, it rarely hampers the DeskJet or the BubbleJet. To clean their ink-spraying nozzles when they do clog, you simply press a button. Over the several months that I tested these two printers, the BubbleJet had an occasional need for such cleaning. If I didn't use it for several days, some of its 48 nozzles would clog. In all such cases, the push-button cleaning feature solved the problem. This is fortunate, because if you can't unclog the BubbleJet's nozzles this way, you have to send the printer back to Canon for repair.

The DeskJet is virtually immune to

clogging because it uses a more soluble ink. Mine never clogged during months of testing, even when left alone for more than two weeks. If for some reason the DeskJet clogs beyond push-button cleaning, simply replace the ink cartridge.

Neither printer prints well on copy paper, which is commonly used as a substitute for high-quality paper in laser printers. The edges of characters and lines

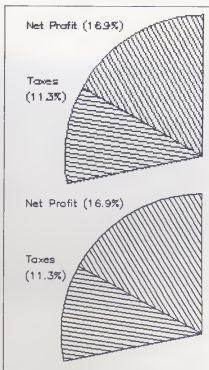


FIGURE 2. A chart printed with *1-2-3's* PrintGraph program on the DeskJet (top) and the BubbleJet (bottom). When printing with PrintGraph, the DeskJet's output is only slightly sharper than dot-matrix output.

appear fuzzy because the ink bleeds into the paper. But both printers print well on paper made with cotton fibers and on paper designed for use in duplicating (or mimeograph) machines. ■

IN BRIEF

HP DeskJet. Hewlett-Packard Co., Customer Information Center, Inquiry Fulfillment Dept., 19310 Pruneridge Ave., Cupertino, CA 95014; 800-752-0900. Requires a parallel or serial port. Released 2/88. \$995. One-year limited warranty; repair or replacement at manufacturer's option.

BubbleJet BJ-130. Canon U.S.A., Printer Division, 1 Canon Plaza, Lake Success, NY 11042; 516-488-6700. Requires a parallel port; optional hardware available for use with serial port. Released 5/88. \$1,095. One-year limited warranty.

HARD DISKS TO GO

Data Pac and Passport offer speed, capacity, and portability. But can either top the Bernoulli Box?

BY PETER G. AITKEN



If you have had to buy hard disks with larger and larger capacities, need to transport a lot of data to other facilities, or store sensitive data on your hard disk, you're a candidate for a removable hard-disk system.

Two such systems, Tandon's Personal Data Pac and Plus Development's Plus Passport, provide the speed, reliability, and capacity associated with fixed disks. But that's not all. If you fill one of Data Pac's or Passport's removable hard-disk cartridges, you can pop in another for about the same cost as a new fixed disk of similar capacity—and you can still use your original cartridge. Whether or not you fill the cartridge, you can remove it and send it to another location for someone else to use, or lock it away to prevent unauthorized access to confidential data.

It's easy to determine which of these two systems best suits your needs. If speed and economy are most important to you, Data Pac is the better choice. Passport, however, will serve you best if you need more than 30 megabytes of storage

per cartridge or if you want to save desk space by mounting your removable hard disk inside your computer rather than outside.

If speed isn't your primary concern, you should also consider Bernoulli Box II—the de facto standard in removable mass storage. That makes your choice more complex. Data Pac and Passport are much faster, store more data per disk cartridge, and use disks that wear longer with regular use. But Bernoulli cartridges are much less vulnerable to damage from physical shock, and as you store more data, they cost much less per megabyte of storage. If you archive lots of data that you access only occasionally, Bernoulli Box II is probably a better choice than a removable hard-disk system.

To make the most informed decision, you may want to evaluate Bernoulli Box II/44, which was announced while I was writing this review. To lend the proper perspective to the other products, I felt it necessary to include results I obtained using this new model, even though at review time the only available unit was a preproduction model. In my tests, Bernoulli Box II/44 ran as fast as Data Pac or

Passport. It also promises to deliver even more long-term economy—measured in dollars per megabyte—than its predecessor.

INS AND OUTS OF CARTRIDGES

Each Data Pac or Passport cartridge contains a storage device similar to a complete fixed hard disk. Both the hard disk and the drive mechanism are contained in the cartridge. Passport cartridges are available in two sizes: 20-megabyte (\$595) and 40-megabyte (\$795) capacities. Each Data Pac cartridge (\$549) holds 30 megabytes of data.

In contrast, each Bernoulli cartridge contains a 5¼-inch floppy disk without the drive mechanism, so you save money on each cartridge. Each Bernoulli Box II cartridge (\$83) can hold 20 megabytes of data, and each Bernoulli Box II/44 cartridge (\$125) can hold 40 megabytes.

But before you can use any of these cartridges, you'll have to buy at least one drive receptacle and a controller card. A single, externally mounted receptacle costs \$659 for Passport, \$699 for Data Pac, \$1,650 for Bernoulli Box II, and \$1,799 for Bernoulli Box II/44.

Each system offers other configurations. You can connect one or two of Data Pac's external-drive receptacles to your computer. An internal receptacle is also available for Tandon's 80286- and 80386-based computers. Passport uses the same receptacle for internal or external installation, and you can connect as many as four of these receptacles inside or outside any computer. If desktop space is a problem for you and if you aren't one of the few people who use a Tandon 286 or a Tandon 386, you'll prefer Passport.

You can install Bernoulli Box II or Bernoulli Box II/44 inside or outside your computer, in single-drive or double-drive configurations. Note that you

Peter G. Aitken is an associate medical research professor at a major eastern university.

can save money with Bernoulli Box's internal receptacles. They cost \$1,300 for Bernoulli Box II and \$1,399 for Bernoulli Box II/44.

Bernoulli Box II/44's cartridges are the same size as Bernoulli Box II's, but they aren't interchangeable. If you upgrade from Bernoulli Box II to Bernoulli Box II/44 and you want to use data stored on your old cartridges, or if you want to copy that data to new cartridges, you'll have to attach both systems to your computer.

THE BEST SYSTEM FOR YOU

Portability—not cost savings—is the reason to choose Data Pac, Passport, or either version of the Bernoulli Box over a fixed hard disk. In this case, portability is defined as the ability to swap disks easily in your own computer or between computers at any time.

If you need no more than 60 megabytes of portable data storage, Data Pac is the most economical among these systems (based on a single, external-drive system). But if you need to store more than that, Bernoulli Box II/44 delivers the most storage space for your money, even though your initial costs are higher (see graph). In fact, beyond 60 megabytes, either version of the Bernoulli Box can cost you hundreds or thousands of dollars less than Data Pac or Passport.

As the table below shows, Data Pac, Passport, and Bernoulli Box II/44 deliver performance comparable to that of a fixed disk and superior to that of Bernoulli Box II. In comparison, Bernoulli Box II is very slow when performing disk-based operations, such as the disk-based database sort I performed in my tests.

Under normal operating conditions, both Data Pac and Passport are as durable as any hard disk and have a longer

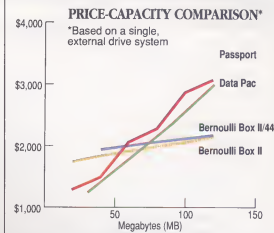
life than a typical Bernoulli cartridge. Data Pac's and Passport's parts suffer almost no wear during operation, and their manufacturers claim that their products should run for tens of thousands of hours before breaking down. You virtually don't have to worry about either cartridge wearing out.

A Bernoulli cartridge is another story. The very nature of its design, which causes the floppy disk that it contains to bend slightly as it works, shortens the life span of the cartridge. According to its manufacturer, under normal operating conditions, a new Bernoulli Box II/44 cartridge will last about five years, which encompasses roughly 1,500 working hours. This is some improvement over the Bernoulli Box II cartridge, which the manufacturer says lasts only "hundreds of hours." Because of these relatively short working lives, you'll be better off using either Bernoulli Box in conjunction with a fixed hard disk rather than in place of one.

If you plan to take advantage of a removable hard disk's portability, how much physical abuse the disk cartridge can withstand in transport will also be important to you. The lighter and more-flexible Bernoulli cartridges are the clear winners here. They are immune to all but the most-severe physical shocks, and to handle or ship them safely requires no more care than that required to mail 3½-inch floppy disks. Also, you can ship a five-ounce Bernoulli cartridge by overnight courier for about two-thirds the cost of shipping a Data Pac or Passport cartridge, each of which weighs about 2½ pounds.

While not as shock-resistant as either Bernoulli cartridge, Data Pac and Passport are much more shock-resistant than a stationary hard disk. I dropped each cartridge onto a table from a height of one foot without damaging either unit and without affecting the stored data. With proper packing, you should be able to ship each cartridge safely. But neither is indestructible; you should handle them as you would an expensive camera.

Cartridges for Passport and for either version of Bernoulli Box come blank. You'll have to format them yourself. Data



If you need more than 60 MB of portable storage, either Bernoulli Box will cost you less than Data Pac or Passport.

Pac's cartridges, called DataPacs, come preformatted and with some software, including DOS, Microsoft Windows, and BASIC. But you can use this software with Tandon's computers only. If you don't have a Tandon computer, you'll have to reformat Data Pac's cartridges. ■

IN BRIEF

Personal Data Pac. Tandon Corp., 405 Science Dr., Moorpark, CA 93022; 805-523-0340. External chassis (Ad Pac) with one receptacle and controller card, \$699. Second receptacle with cable and adapter, \$449. 30-megabyte disk cartridge (Data Pac), \$549. Pricing for internal receptacle (In Pac), for Tandon 80386 computer only, differs from dealer to dealer. Released 1/88. One-year manufacturer's warranty.

Plus Passport. Plus Development Corp., 1778 McCarthy Blvd., Milpitas, CA 95035; 800-624-5545. Single-drive adapter and base housing for internal or external installation, \$659. External chassis to hold two single-drive adapters, \$399. 20-megabyte disk cartridge, \$595; 40-megabyte disk cartridge, \$795. Released 8/88. One-year manufacturer's warranty.

Bernoulli Box II. Iomega Corp., 1821 West 4000 South, Roy, UT 84067; 801-778-1000. Dual-drive external subsystem, \$2,350; single-drive external subsystem, \$1,450. Internal master (first) drive, \$1,100; internal slave (second) drive, \$900. PC/AT controller card (PC2-50), \$200; PS/2 microchannel adapter card, \$399. 20-megabyte cartridge, \$83. Released 7/87. One-year manufacturer's warranty.

Bernoulli Box II/44. Dual-drive external subsystem, \$2,799; single-drive external subsystem, \$1,799; single internal drive, \$1,399. 44-megabyte cartridge, \$125. Released 3/89.

PERFORMANCE COMPARISON OF MASS-STORAGE DEVICES¹

	Retrieve Worksheet	Sort Database ²
Personal Data Pac	0:23	0:58
Plus Passport	0:30	1:18
Bernoulli Box II	0:36	3:16
Bernoulli Box II/44	0:21	1:03
MiniScribe 3053 (44-MB fixed hard disk, used for comparison)	0:31	1:09

¹ Times are in minutes and seconds.

² The sort was performed with *Parade* (Horland International, Scotts Valley, Calif.), which sorts data on disk rather than in memory.

ADVERTISING INDEX

Reader Service Number	Advertiser	Page
—	3M	31
—	Anthro Corporation	106
114	Ashton-Tate	42-43
115	Ashton-Tate	11
116	Ashton-Tate	86-87
—	AST Research Inc.	107
121	Baler Software	109
126	BASF	Cover 3
127	Best Programs	Cover 4
—	Compaq	62-63
101	Computer Associates	2-3
113	Concetric Data Systems Inc.	41
110	Crosstalk Communications	64
—	Dow Jones	81
117	Frontline Systems Inc.	89
129	Funk Software	39
111	Group One Software	33
120	HavenTree Software Limited	96
105	Hewlett-Packard	8-9
118	Insight Development	93
—	Lotus Development Corporation	28-29, 69
—	Microsoft International	52-53
112	Personics Corporation	35
125	Personics Corporation	91
107	Primavera Systems Inc.	17
104	ProFance Technologies Inc.	7
128	Que Corporation	97
106	Reasonable Solutions Inc.	21
103	Resource Analysis International	6
—	Software Publishing	Cover 2
109	Tech Hackers Inc.	23
108	Toshiba	15
119	United Software Security Inc.	95
—	Unysis	98-99
102	Verbatim	5
PRODUCT SHOWCASE:		
122	General Optimization, Inc.	111
124	Goldata	111
123	Manusoft Corporation	111

ADVERTISING REPRESENTATIVES

NEW ENGLAND

Joan Donahue
The Donahue Co., Inc.
31 Shipway Place
Charlestown, MA 02129
(617) 242-3042

MID-ATLANTIC/SOUTHEAST

Richard K. Felt, D. Douglas Johnson
Felt, Johnson & Associates
P.O. Box 199
Devon, PA 19333-0199
Felt (215) 688-9342
Johnson (215) 935-8522

MIDWEST

Joseph P. Gleason
The Grail Company
512 W. Burlington
LaGrange, IL 60525
(312) 352-4090

SOUTHWEST/MOUNTAIN

Kelly Pierce
HIGH EXPOSURE
2911 Turtle Creek, Suite 300
Dallas, TX 75219
(214) 522-5007

SOUTH PACIFIC

Arlagh Hupp
HuppCo-Media
359 San Miguel Drive, Suite 203A
Newport Beach, CA 92660
(714) 720-0222

SAN FRANCISCO/SILICON VALLEY

Don Farria
Don Farria Company Inc.
P.O. Box 936
2555 Flores, Suite 200
San Mateo, CA 94403
(415) 349-2222

SAN FRANCISCO/NORTHWEST

Lauren Scott
Lauren Scott Company
P.O. Box 881596
San Francisco, CA 94188
(415) 621-7490

EDITORIAL EVALUATION

Your comments about *LOTUS* magazine help us bring you the best editorial product each month. To rate the articles in this issue, scan the list below and refer to the EDITORIAL EVALUATION card on the bottom of the insert to the left. Identify the number corresponding to each article, then circle the number on the card that reflects your rating.

NO.	TITLE	PAGE
1	@LOTUS	10
2	IDEAS & TRENDS	12
3	START HERE An Introduction to Menus	26
4	1-2-3 MACROS Macro Letters	30
5	SYMPHONY MACROS From the Pointer's View	36
6	FEATURE Pushing 1-2-3 to Its Limit ... and Beyond	44
7	FEATURE Eight Better Ways	48
8	FEATURE How to Divvy Up Overhead Allocations	54
9	FEATURE Spreadsheet Challenge	58
10	FEATURE A Financial Calculator That Does It All	65
11	FEATURE Behind the Hype for Groupware	70
12	FEATURE To Buy or Not To Buy	76
13	Q&A	82
14	GOOD IDEAS	88
15	REVIEW <i>Ready-to-Run Accounting for 1-2-3</i>	92
16	REVIEW DeskJet vs. BubbleJet	100
17	REVIEW Hard Disks To Go	102
18	NEW PRODUCTS	105
19	ESSAY Lotus's Next Challenge	112

This card expires 12/1/89

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Comments _____

CIRCLE THE NUMBERS FOR FREE INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210

EDITORIAL EVALUATION

[illegible]

*For Free
Information*

To receive more information about products and services advertised in this issue, please use one of these Reader Service cards. Just circle the numbers on the card that correspond to the Reader Service numbers on advertisements and new product announcements, and drop the postage-paid card in the mail.

You can use the same card to tell the editors of *LOTUS* how you feel about the articles you read in this issue:

- 1 Get the assigned number for each article from the Editorial Evaluation list on the facing page.
- 2 Use that number to locate the appropriate column of boxes on the card.
- 3 Note the key words at the left and put an x in the square that best reflects your reaction to that article.

May 1989

This card expires 12/1/89

Name		
Title		
Company		
Address		
City	State	Zip
Phone		
Comments		

CIRCLE THE NUMBERS FOR FREE INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210

EDITORIAL EVALUATION

[illegible]



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 746 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

LOTUS

Reader Service Department
P.O. Box 5140
Pittsfield, MA 01203-9860



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 746 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

LOTUS

Reader Service Department
P.O. Box 5140
Pittsfield, MA 01203-9860

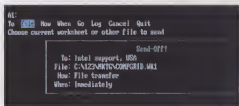


Send-Off! for Swift and Simple Communications from Within 1-2-3

If you send worksheets to others, Intel Corp.'s *Send-Off!* add-in for 1-2-3 can make your work faster and easier. The add-in works only in conjunction with Intel's Connection CoProcessor Communications board, which, in turn, works only with IBM-compatible computers that don't use a Micro Channel bus. Thus equipped, from within 1-2-3 you can transmit worksheets or other files to computers that have Connection CoProcessors or facsimile boards or to stand-alone facsimile machines.

Worksheet files are often large and can take a long time to transmit. The Connection CoProcessor solves that problem in two ways. It sends files or faxes at 9,600 bits per second (bps)—four to eight times the speed of most modems. And it uses its own microprocessor and memory to do so in the background, so you can immediately return to your spreadsheet work or exit 1-2-3 to use another program.

When you transfer files via *Send-Off!*, you don't need to specify communications parameters as you do when you use conventional communications programs. The Connection CoProcessor software automatically makes the necessary settings. And you don't need to master a new program. From within 1-2-3 you simply indicate what you want to send (the current worksheet or another file), to whom you want to send it (an individual or a group), how you want to send it



(as a file or as a facsimile), and when (immediately or at a later time).

Send-Off! maintains telephone books of names and numbers and can automatically send files or facsimiles to groups of people. Since the Connection CoProcessor supports the most popular communications standard for facsimile transmission, CCITT Group III, you can automatically dial most other systems to look for files that you want to download to your computer. You can automatically transmit files when designated computers call your computer.

Some of the program's features are available elsewhere. Several PC-based fax boards let you capture and transmit screens or capture and transmit data sent to a printer. Also, most fax boards that operate at 9,600 bps cost \$100 to \$300 less than the \$995 Connection CoProcessor. What makes Intel's product unique is its combination of speed, background operation, ease of use, and facsimile- and file-transfer capabilities. The only thing the basic Connection CoProcessor won't do is work with ordinary communications software, the kind that enables you to use on-line services and perform Xmodem file transfers. A \$295, 2,400-bps, Hayes-compatible modem on a board, also from Intel, answers that need. The modem board piggybacks onto the Connection CoProcessor so that it doesn't occupy another expansion slot.

Programs other than 1-2-3 that work with the Connection CoProcessor include Symantec Corp.'s Q&A, WordTech Systems' *dBXL* and *Quicksilver*, DCA/Crosstalk Communications' *Crosstalk*

Communications without tribulations.

Send-Off! is a 1-2-3 add-in that works with Intel's \$995 Connection CoProcessor. The program lets you send files or facsimiles from within 1-2-3.

Mk4, Alcom Inc.'s *LanFax/10*, and Enable Software's *Higgins*. An add-in similar to *Send-Off!*, to be used with *WordPerfect*, was scheduled for release in April. It is free upon request from Intel to registered Connection CoProcessor users. Future versions of cc:Mail Inc.'s *cc:Mail* and Borland International's *SideKick Plus* will work with the coprocessor, and Ashton-Tate has announced that it will support it as well.

If *Send-Off!*'s ease of use appeals but you want to spend less than the price of a Connection CoProcessor, you have another option. Intel says that sometime this year it will release a program that will work with 1,200-to-2,400-bps Hayes-compatible modems. The forthcoming program won't deliver the speed or background operation of the Connection CoProcessor, nor will it transmit or receive facsimiles, but Intel says it will be as easy to use as *Send-Off!*. The company won't give a release date or price for the forthcoming program.

—Bruce Brown

Send-Off! Intel Personal Computer Enhancement Operation, 5200 Northeast Elam Young Pkwy., Hillsboro, OR 97124-6497; 800-538-3373. Runs on the IBM PC, PC XT, PC AT, and compatible computers with 640K of RAM and a hard disk. Requires DOS 3.0 or higher. Works only in conjunction with the Intel Connection CoProcessor (\$995) and 1-2-3 Release 2/2.01. Also requires a VGA, EGA, CGA, or Hercules-compatible graphics adapter. Released 2/89. \$50; free to registered Intel Connection CoProcessor board users and bundled with the Connection CoProcessor as of the program release date.

CIRCLE 1 ON READER SERVICE CARD

ALSO IN THIS ISSUE

THE BUDGET EXPRESS	106
BUSINESS SOFTWARE	108
OTHER SOFTWARE	108
GRAPHICS UTILITIES	109
OTHER UTILITIES	109
HARDWARE	110
UPGRADES	110
BOOKS	110

NEW PRODUCTS

The Budget Express: Lots of Help for Budgeting in 1-2-3

The 1-2-3 add-in *The Budget Express* combines tools for manipulating budgets with several general-purpose spreadsheet utilities. The program lets you quickly set up a new budget worksheet, and you can use any existing worksheet-based budget. You can suppress detail in favor of subtotals or totals, use more data than your available RAM normally accommodates, and monitor your progress toward a budgetary goal.

The program's most visible feature is its ability to collapse spreadsheet rows or columns into, in effect, a spreadsheet outline. That's valuable not only because it helps you get a quick overview of the budget but because it also lets you move quickly to a particular section of a large budget. Once there, you can expand the section and examine the underlying detail. There are ways to see similar results

BS1: (1,2) BUDGET00 . E17..E16..E15..E14..E7..E6)

	A	B	C	D	E	F	G	H	I
1	Office Budget for 1989								
2									
3									
4									
5	Positively Expenses	300	720	960	480				
6	+ Premiums	1,875.00	1,875.00	1,858.00	1,858.00				
7	+ Equipment	445.00	445.00	445.00	445.00				
8	+ Payroll								
9	+ Holly	4,100.00	4,100.00	4,100.00	4,100.00				
10	+ Jim	4,100.00	4,100.00	4,100.00	4,100.00				
11	+ Stan	1,732.00	1,732.00	1,732.00	1,732.00				
12	+ Audrey	1,848.00	1,848.00	1,848.00	1,848.00				
13									
14	Total Payroll	11,772.00	11,772.00	11,772.00	11,772.00				
15	+ Travel Expenses	440.00	440.00	440.00	440.00				
16	+ Entertainment	25.00	25.00	25.00	25.00				
17	+ Misc. Expenses	42.00	42.00	42.00	42.00				
18									
19	Total Monthly Expenses	13,799.00	13,799.00	13,774.00	13,774.00				
20	Goal: 12,000.00, Now: 13,799.00								

You can quickly get an overview of your budget and move to any part of it because *The Budget Express* lets you suppress any amount of detail in favor of totals. The plus signs in column A indicate the presence of hidden detail. As you change budget values in an effort to achieve a specified goal, a scoreboard in the lower-left corner of the screen monitors your progress.

in 1-2-3 alone, but not without considerably more time and effort, and with considerably less flexibility.

The Budget Express reduces memory limitations by temporarily storing worksheet data on your disk until you need it. For example, when you suppress the display of any rows, you can choose to store those rows to disk to free up memory. When you choose to redisplay the stored rows, however, the process takes a bit longer than if they were still in memory. With small spreadsheets you won't notice

the delay. With larger ones you will notice a pause, but I deem the availability of the extra data worth the slight delay. The faster your computer and hard drive, the less apparent the delay.

Once you've saved one or more rows to disk, you can protect them with a password. Since this feature doesn't also encrypt the saved data, the data is not secure from anyone who really wants to read it. But, as with 1-2-3's password-protection scheme, the feature is enough to exclude casual snoopers.

The program's ability to monitor how each change affects the whole budget eliminates the need to scroll, or "window," for that purpose. Suppose, for example, that you have to cut your budget by 15%. As you reduce individual line items, *The Budget Express* tracks how much more the entire budget has to be reduced to make the 15% goal. You begin by entering a target value—expressed as an absolute value, a percentage, or a delta (difference)—for the cell containing the budget total. Then, as you change other cells that affect the target cell, you use an on-screen scoreboard to track your progress toward your goal.

The add-in also helps set up your budget. It enters formulas for row and column totals on command and can automatically enter some column headings, such as successive months. If you plan to record data in more than one column per month—perhaps for budgeted, actual, and variance data—you can instruct *The Budget Express* to allocate the number of columns needed to each month as it sets up the budget.

The program can automatically roll up the budget into quarterly reports. If you've used more than one column per month, *The Budget Express* will roll up

Continued on page 108

Call us for a free AnthroCart catalog: 800-325-3841



Anthro®
Technology Furniture®
3221 N.W. Yeon St.
Portland, Oregon 97210
(503) 241-7113

Anthro, AnthroCart and Technology Furniture are registered trademarks of Anthro

AST's Rampage.[®] It Knocks The Above Out Of Above Board.[™]

INTEL PC60
ABOVE BOARD PLUS

5.6

INFOWORLD
REPORT CARD

AST RESEARCH
RAMPAGEPLUS 286

7.4

INFOWORLD
REPORT CARD

Memory Boards
Report Card

INFO
WORLD

AST's RampagePlus 286 not only knocks the above out of Intel's Above Board Plus, according to InfoWorld's December 12, 1988 issue, it stands alone as "this product category's technology leader."

InfoWorld Report Card Memory Boards	AST Research RampagePlus 286	Intel PC60 Above Board Plus
Performance		
EMS 4.0 capabilities	Excellent	Satisfactory
Software compatibility	Good	Good
Hardware compatibility	Good	Good
Speed: large applications	Good	Good
Speed: multitasking	Excellent	Satisfactory
Expandability	Very Good	Satisfactory
Documentation	Very Good	Good
Setup	Good	Satisfactory
Ease of use	Good	Satisfactory
Serviceability		
Workmanship	Very Good	Satisfactory
Support policies	Good	Excellent
Technical support	Good	Good
Value	Very Good	Satisfactory
Final scores	7.4	5.6

Source: InfoWorld December 12, 1988

RampagePlus 286 for your IBM® PS/2® 30 286, AT® or compatible, or RampagePlus/MC for your IBM PS/2 50, 50Z or 60, offer up to 8 MB of expanded memory, OS/2™ compatibility and optional I/O piggyback modules. And most important, full EMS 4.0 support—in fact, InfoWorld says RampagePlus 286 "supports EMS 4.0 better than any other board tested."

Receiving high marks isn't new to us. We've sold more memory/multifunction boards than any other company. Award-winning boards, like SixPakPlus® and Advantage®. We're proud to say the RampagePlus boards are our best ever. Obviously InfoWorld agrees: "Its speed, documentation, ease of setup and use, and quality of workmanship all contribute to making it the best value among these boards."

To find out more, call AST, (714) 863-0181, Operator BB23, or send us the coupon.



Please send me a reprint of the InfoWorld article so I can see for myself how AST's RampagePlus 286 "clearly outperformed the other products in this category."

Please send me more information on

" RampagePlus 286 RampagePlus/MC

Please have an AST representative call me

I am ☐ an end user ☐ a reseller

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Phone (____) _____

Send to AST Research, Inc. 2121 Alton Avenue, Irvine, CA 92714-4992 Attn: M.C.

Lotus 5/89

AST markets products worldwide—in Europe and the Middle East call 44 1 666 4390; in Japan call 03 447 6427 K020; in the Far East call 852 3 906 4335; in Canada call 416 446 8216. AST logo, Rampage, SixPakPlus and Advantage registered trademarks of AST Research, Inc. All other product and brand names are trademarks and registered trademarks of their respective companies. Copyright © 1989 AST Research, Inc. All rights reserved.

AST[®]
RESEARCH INC.

Times Have Changed.

NEW PRODUCTS

the data included in the extra columns into the quarterly report too.

One particularly nice time saver helps if you work with several budgets at once. *The Budget Express* can consolidate budgets—even somewhat dissimilar ones—by matching labels, account order, or cell locations. It takes a while to learn how to use this feature. Once you do, however, you'll save time on successive consolidations because you can save the consolidation specification, then reuse it as is or modify it.

—Bruce Brown

The Budget Express, Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408-253-9600. Requires 1-2-3 Release 2/2.01 and runs on the IBM PC, PC XT, PC AT, PS/2, and compatible computers with DOS 2.0 or higher. Requires 64K of RAM above that used by 1-2-3. Supports all 1-2-3 monitor and printer drivers. Also supports math coprocessors and LIM-EMS versions 3.2 and later. Due to be released 5/89, \$149.

CIRCLE 2 ON READER SERVICE CARD

BUSINESS SOFTWARE

Locate Your Market Niche, Rate the Competition

Target Market Selector, a template for 1-2-3 and *Symphony*, helps you find the optimum market segment in which to sell your company's product or service. With the program, you produce a plan in several markets, showing your company's strengths and those of your biggest competitor. You decide how well your company's resources, such as your sales force's experience, match the market in which you want to compete. The program indicates the most promising markets and the areas within them where you need work to improve your competitive edge.

Requires 1-2-3 Release 2/2.01 or *Symphony* Release 2.0 and uses 75K of RAM. \$199, from Successware, 203 Annandale Dr., Cary, NC 27511; 919-469-0119.

CIRCLE 3 ON READER SERVICE CARD

Find Ginnie Mae, Fannie Mae, and Similar Securities' Yields

Mortgage-Backed Calculations is a 1-2-3 add-in that lets you figure the yield of one or more GNMA (commonly known as Ginnie Mae), FNMA (Fannie Mae), FHLMC (Freddie Mac), FHA, and similar mortgage-backed securities. The program adds 33 @functions to 1-2-3 that let you calculate the declining-interest amounts paid by these securities, as well as quoted and cash flow yields and

prices, prepayment rates, service fees, and differing lengths of maturities. An advanced version of the product lets you figure the implied prepayment rate, total returns, and bond-equivalent yields and has the Public Securities Association and FHA prepayment-rate models. A shortcut method is available for analyzing one security quickly. This uses a preconfigured 1-2-3 worksheet that calculates the security's value and sensitivity ratios.

Requires 1-2-3 Release 2/2.01 and uses 32K of RAM. \$395, Advanced Version \$695, from Intex Solutions, 161 Highland Ave., Needham, MA 02194; 617-449-6222.

CIRCLE 4 ON READER SERVICE CARD

Multiuser Order-Entry Module for Large Inventories

The *On the Money!* accounting series now has *Order Entry*, which, when combined with other modules, lets you integrate all aspects of orders, inventory supplies, accounting, and billing. It is designed for businesses with unusually large numbers of inventory items to track, such as auto-parts suppliers. The program allows you to give multiple part numbers and descriptions to a single item in order to fill requests with a generic part that serves the same purpose. The program automatically generates a volume discount on a total sale so that even though some items may come from multiple vendors, the customer would qualify for a volume discount. The program was designed for multiuser systems but also runs as a stand-alone program. It imports and exports line-delimited or comma-delimited ASCII files.

Requires *On the Money!*'s *Systems Administration* (\$250, single-user version); \$350, multiuser version), *Inventory*, (\$795), and *Accounts Receivable* (\$795)



modules and uses 384K of RAM. Runs on the IBM PC XT, PS/2, and compatible computers with a hard disk. \$795, from Parker Systems, 10855 Sorrento Valley Rd., Suite 201, San Diego, CA 92121; 800-458-1049, in Calif. 619-452-0395.

CIRCLE 5 ON READER SERVICE CARD

Analyze Short-Term Options Using 1-2-3 @Functions

Option Price Calculations is a 1-2-3 add-in that lets you calculate yields on short-term stock, bond, futures, commodity, and currency options, among others. You can analyze put and call options using American and European methods. Thirteen @functions let you value a portfolio of options according to implied volatility, a modified Black-Scholes model, or sensitivity calculations such as delta, gamma, vega, and theta. An included 1-2-3 worksheet projects the value of, and provides sensitivity ratios for, individual options.

Requires 1-2-3 Release 2/2.01 and uses 32K of RAM. \$395, from Intex Solutions, 161 Highland Ave., Needham, MA 02194; 617-449-6222.

CIRCLE 6 ON READER SERVICE CARD

OTHER SOFTWARE

1-2-3/Symphony Statistics and Mathematics Add-in

@Stats provides 44 statistical and mathematical @functions, as well as a number that perform tasks related to worksheet ranges. Statistical functions for linear regression let you find the constant value of range y compared with range x and the standard error of the slope. You can calculate percentiles, skewness, kurtosis, and standard deviations. Mathematical functions let you use Simpson's method to evaluate curves and interpolate values in range x corresponding to range y. Range functions let you calculate averages, variances, and sums or count the number of positive cells.

Requires 1-2-3 Release 2/2.01 or any release of *Symphony* and uses 32K of RAM. \$295, from Intex Solutions, 161 Highland Ave., Needham, MA 02194; 617-449-6222.

CIRCLE 7 ON READER SERVICE CARD

1-2-3 Release 2.01 Training

Lotus 1-2-3 Made Easy by Video contains a two-hour videotape and disk for learning the basics of 1-2-3 Release 2.01. The lessons are designed for the beginning computer user, and they explain the basics of the keyboard, as well as of 1-2-3.

NEW PRODUCTS

Preconfigured worksheets and macros on the disk refer to the video instructions. The training includes learning to use and make macros.

Runs with 1-2-3 Release 2.01. \$39.95 in VHS format, from Video Response, 1477 East Cedro Circle, Sandy, UT 84093; 801-561-8484.

CIRCLE 8 ON READER SERVICE CARD

GRAPHICS UTILITIES

Link One Source CD/Investment and Graphwriter II

Stock Chart helps move stock market data from a *Lotus One Source CD/Investment* stock-history database into *Graphwriter II*. The program has preconfigured settings to produce charts that show high-low-open-close prices, volume, five- and ten-period moving averages, relative strength of a stock, percent of volume distribution, and company-versus-index comparisons.

Requires *Lotus One Source CD/Investment*, 1-2-3 Release 2/2.01, and *Graphwriter II* and uses 640K of RAM. Included free with a subscription to the *Data Daily Stock Price History* module of *CD/Investment*, from Lotus Development



Corp., 55 Cambridge Pkwy., Cambridge, MA 02142; 617-577-8500.

CIRCLE 9 ON READER SERVICE CARD

Bitstream Font Offer for Freelance Plus 3.0

Fontware Starter Kit lets you install in *Lotus Freelance Plus* Release 3.0 any typeface from the *Bitstream Fontware Library*. The starter kit includes Dutch

typeface, which is Bitstream's version of Times Roman, in four styles: regular, bold, italic, and bold italic. Bitstream's library includes 52 packages (\$195 apiece), each of which usually contains one family of type, such as Helvetica or Serif, in four styles.

Requires *Lotus Freelance Plus* Release 3.0 and 1 megabyte of hard-disk space, \$15, from Bitstream, Athenaem House, 215 First St., Cambridge, MA 02142; 800-522-3668, in Mass. 617-497-6222.

CIRCLE 10 ON READER SERVICE CARD

OTHER UTILITIES

1-2-3 Macro Collection and Tips for Customizing

Macromania: Files and Tips for Lotus 1-2-3 contains more than 100 macros for 1-2-3 Release 2/2.01. These macros let you convert serial dates to labels, convert labels from lowercase to uppercase, search for and replace labels, find all matches of a label, print multiple copies of a range, and switch the contents of cells. Special-application macros let you generate an employee expense report, print mailing labels, and figure loan amortizations. The program also has tips on

If You Write Worksheets For Others...

and are frustrated when your users

- accidentally or purposely modify your worksheets
- complain about long recalcs
- still need a spreadsheet program to run them

then look to Baler 4.0 to build secure, faster-running applications that execute without the original program used to create them.

As easy as 1, 2, 3

Take advantage of over 40 extensions to the *Lotus 1-2-3 "language"* by using the Baler tools as you develop your spreadsheet applications. Add a custom full-screen menu; turn the borders off; permanently limit access to only portions of your worksheet; even add a personalized opening screen!

Baler carefully reviews the contents of the resulting WK1 file and automatically builds a

fast, tamperproof executable version from the instructions in this file. The baled program is completely self-contained and requires no other software to run. Hundreds of Fortune 1000 companies already enjoy the faster recalcs, invisible formulas, and royalty-free worksheets that Baler provides.

Baler is the spreadsheet compiler standard

The developers of Baler pioneered this new class of software in 1984. Since then Baler has grown to become the favorite of both product reviewers and customers alike from all over the world.

Our entire company is focused on bringing you the best this technology has to offer, with a level of product support to match. You can expect the best with Baler.

Version 4.0 Supports Networks

Now Baler is even better! Version 4.0 gives you your baled worksheets data file locking on a network, much faster macro execution, new expanded documentation and more.

To see for yourself why *InfoWorld* said "Baler does a remarkable job of producing stand-alone templates," order our \$10->disk demo. Or try Baler itself for \$495, with a 30-day money-back guarantee!

800-327-6108

FAX: 312-884-9423

Baler™
SPREADSHEET COMPILERS

Baler Software Corporation 2300 N. Barrington Road, 4th Floor Hoffman Estates, IL 60109

Lotus and 1-2-3 are registered trademarks of Lotus Development Corp

NEW PRODUCTS

how to customize nearly all the macros.

Requires 1-2-3 Release 2/2.01 and comes on eight worksheets, the largest of which uses 13K of RAM; uses 110K of RAM for all eight. \$59.95, from InfoSource, 420 Lake Howell Rd., Suite 104, Maitland, FL 32751; 800-622-2995.

CIRCLE 11 DN READER SERVICE CARD

Ventura Publisher Made Easier

Desktop Manager pops up over *Ventura Publisher* to perform a variety of file-management and DOS operations. You can copy, rename, move, and create files from within *Ventura Publisher*. The program lets you track various publishing projects and note who worked on them. It tells you which files are attached to which *Ventura Publisher* document, automatically backs up files, and prints a descriptive summary of any document.

Requires *Ventura Publisher* Version 2.0 and uses 30K of RAM. Runs on the IBM PC AT and compatible computers with 640K of RAM. Manufacturer recommends an EGA or Hercules graphics adapter and a mouse. \$99.95, from Que Corp., 11711 North College Ave., Carmel, IN 46032; 800-428-5331 ext. 899, in Ind. 317-573-2500.

CIRCLE 12 DN READER SERVICE CARD

HARDWARE

Faster PostScript Printing on a Laser and on a LAN

Q-Script is a controller board and PostScript-compatible software for using page-description language on the Hewlett-Packard LaserJet Series II, Toshiba's PageLaser 12, Ricoh PC Laser series, Brother HL8, Canon LBP-8II, and compatible printers. You can use one Q-Script to serve all the PCs on a LAN. The unit

contains 3 megabytes of memory and runs in the background. The manufacturer claims that Q-Script makes your printer operate two to three times faster than the Apple LaserWriter Plus.

Runs on the IBM PC, PS/2 Model 30, and compatible computers and occupies one full slot. \$2,495, from Bell & Howell Quintar Co., 411 Amapola Ave., Torrance, CA 90501-1493; 800-223-5231, in Calif. 213-320-5700.

CIRCLE 13 DN READER SERVICE CARD

Run DOS Applications on the Mac II and IIx

The Mac/DOS II is a coprocessor card that lets you partition the hard disk of, and run all DOS-based applications on, an Apple Macintosh II or IIx. Under the Apple MultiFinder operating environment, you can have one DOS-based application, such as 1-2-3, and several Mac-based applications run simultaneously in separate windows, and you can cut and paste among them. You can display DOS-based programs in Macintosh typefaces and styles, but you can print only the fonts your software supports. The coprocessor supports 640K of RAM but not extended or expanded memory; the IBM CGA, MDA, or compatible cards; and any DB9 serial-port compatible LAN.

Requires the Apple Macintosh II or IIx. Manufacturer recommends a DaynaFile external drive for frequent transfers between PCs and Macs. \$1,595, includes cable to link PC to Mac and utility software. From Perfectek Corp., 1455 McCarthy Blvd., Milpitas, CA 95035; 408-263-7777.

CIRCLE 14 DN READER SERVICE CARD

UPGRADES

Forecast!, formerly 1,2,3 *Forecast*, now handles 150 more observations, supports 2 more regression variables, and allows for 52 periods to analyze seasonality. The template measures data fit through MAPE (mean absolute percentage error) and degrees of freedom for regression. It now provides standard statistical processes and graphs histograms.

Requires 1-2-3 Release 2/2.01 and 384K of RAM, which includes 1-2-3's requirements. \$145, from Intex Solutions, 161 Highland Ave., Needham, MA 02194; 502-449-6222.

CIRCLE 15 DN READER SERVICE CARD

4-5-6 *Link* Version 1.1 now supports the IBM Micro Channel Architecture and 3270-emulation boards, a 102-key keyboard layout, and 9,999 rows of data. It uses the Alt-F9 and Alt-F10 and Control-

F1 and Control-F2 key combinations, so it no longer conflicts with add-in "hot keys."

Requires any release of 1-2-3 or *Symphony*, 384K of RAM for itself, and nearly any terminal-emulation board. \$199, from Intex Solutions, 161 Highland Ave., Needham, MA 02194; 617-449-6222.

CIRCLE 16 DN READER SERVICE CARD

BOOKS

Lotus Companion: Added Software Resources, by Ronny Richardson. Published March 1989, 480 pages, \$22.95 (paper-



back), from Tab Books, Blue Ridge Summit, PA 17294-0850; 800-822-8158, in Pa. and Alaska 717-794-7191.

CIRCLE 17 DN READER SERVICE CARD

The Lotus Guide to Using Manuscript Release 2, by Christie Williams. Published January 1989, 624 pages, \$24.95 (paperback), from Addison-Wesley, Reading, MA 01867; 617-944-3700.

CIRCLE 18 DN READER SERVICE CARD

LaserJet Companion, by Mark Crane and Joseph Pierce, has separate chapters on publishing with 1-2-3, *WordPerfect*, *Ventura Publisher*, *Aldus PageMaker*, *Microsoft Excel*, and others. Published November 1988, 700 pages, \$24.95 (paperback), from The Cobb Group, P.O. Box 24480, Louisville, KY 40224; 800-223-8720, in Ky. 502-491-1900.

CIRCLE 19 DN READER SERVICE CARD

Information for New Products is supplied by the vendors and was up-to-date as of 3/10/89. Since production specifications change frequently, we recommend that you verify this information with a dealer before making a purchase.



What'sBest!®

Some users aren't talking:

"You are not to disclose to anyone that our company owns or uses What'sBest!"

— Major Wall Street Brokerage

Some users are:

"What'sBest! is a powerful addition to our arsenal of PC software... a valuable tool available to industry."

— Don Freeland, Procter & Gamble

Maximize Profit...Minimize Cost in 1-2-3 with What'sBest!

For information,
call 1-800-441-BEST
In Illinois, 312-248-7300



General
Optimization, Inc.

(what you do with it is your business)

CIRCLE 122 ON READER SERVICE CARD

Turn 1-2-3® into a Complete, Powerful Accounting System



Ready-to-Run Accounting for Lotus 1-2-3

\$199.95

Over 30,000 users let Ready-to-Run Accounting transform 1-2-3 into a powerful, integrated accounting system including General Ledger, Accounts Payable, Accounts Receivable, Payroll, Inventory/Order-Entry, and Financial Analysis. Completely

menu-driven • Automated data-entry • Generates dozens of customizable reports • All data in 1-2-3 files for easy access • Prints checks, invoices, customer statements, payroll checks...

"... a powerful accounting system for the money."

PC Magazine

"The manual is one of the clearest that I have read..."

Absolute Reference

Order now and mention this ad to receive a \$20 discount!

Call 800-292-6123

(CA: 213-559-1564)

manusoft Corporation

CIRCLE 123 ON READER SERVICE CARD

PRODUCT SHOWCASE

Reach
our
350,000
subscribers!



Call our Inside Sales Department at
617-225-6803
to reserve space.

The close date for the July issue is May 25th.

SAVE MEMORY BY LINKING WORKSHEETS

It's Dynamic!

Dynamically link data between worksheets in memory and worksheets on disk. As data is updated on dependant worksheets on disk, **WORKSHEET LINKS** automatically updates your worksheet in memory. And it uses only 19K.

It's Flexible!

WORKSHEET LINKS lets you link by cell address, named range or it can even look up a string like "TOTAL" and return the value to the right. There's no limit to the number of worksheets you can link to. And it uses only 19K.

It's Inexpensive!

WORKSHEET LINKS is only \$49.95 and comes with **GOLDATA's** 30-day money back guarantee. Call today for your risk-free trial or download a demo on our BBS by calling (215) 257-6597.

**CALL FOR YOUR
RISK-FREE TRIAL!
1-800-432-3267**

GOLDATA

2 Bryn Mawr Avenue
Bryn Mawr, PA 19010

CIRCLE 124 ON READER SERVICE CARD

LOTUS'S NEXT CHALLENGE

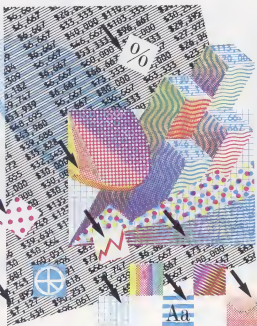
BY JEFFREY TARTER

Lotus has endured such corporate agony finishing *The Spreadsheet of the Future* (1-2-3 Release 3) that I hate to break the bad news: The job isn't finished yet.

It's true that Lotus has done an imaginative and generally sensible job of adding wish-list features to 1-2-3 without mucking up the program's basic elegance. And it has implemented some truly visionary concepts, such as cross-platform compatibility, that may trigger a new wave of creative applications development among Lotus users. But Lotus has left out the most important futuristic feature of all: a fully integrated graphical environment.

The software industry is moving inexorably toward a graphical standard, yet Lotus's top brass keep predicting that most 1-2-3 users will ignore the graphical revolution. According to the Lotus party line, only a bit-mapped lunatic fringe will ever adopt products like Microsoft's *Excel*, Informix's *Wingz*, Ashton-Tate's *Full Impact*, and even its own 1-2-3/G.

Sorry, Lotus. Graphical spreadsheets *are* the wave of the future. Within five or six years, we will see an enormous user migration to fully integrated graphical environments. The big attraction is not just ease of use or the mythical standard user interface. The real advantage of graphical environments is that they communicate information better. Multiple type fonts and sizes, shading, integrated graphs and charts, icons—all of these graphical design elements increase our ability to convey and to grasp information. Just as a simple chart or graph instantly communicates more information



than a worksheet of raw numbers, a fully graphical spreadsheet provides a vastly better tool for analysis, data management, and presentation.

So far, Lotus has missed the most obvious clues about why graphical environments are important. For instance, Lotus was caught flat-footed when many of its best customers wanted to create presentation-quality spreadsheet documents with their new laser printers. Because 1-2-3 Release 2 lacks WYSIWYG (what you see is what you get) formatting capabilities and produces output that looks as if it came from a dot-matrix printer, thousands of once-loyal 1-2-3 users switched to *Excel*.

(The fact that Funk Software's *Always* add-in was available as a stopgap temporarily saved Lotus's bacon on this issue. But *Always* is just a printing utility that enhances 1-2-3's presentation capabilities, without adding any new analytical or data-management features.)

Unfortunately, Lotus has a history of missed opportunities with graphical products. *Jazz* and *Modern Jazz* failed to define what a graphical spreadsheet should be. And Lotus also managed to overlook the emerging market for graphing and charting add-ins, though it gained back a foothold by acquiring *Freelance* and *Graphwriter*.

Looking at the Lotus track record with graphical products, I'm especially skeptical whenever anyone from Lotus insists that graphical spreadsheets will never succeed. The two main reasons cited are performance problems and limitations on backward compatibility with existing character-based versions of 1-2-3.

Of course, there's some truth to these arguments. Unlike its competitors, Lotus can't just build a new spreadsheet from scratch that ignores previous versions of 1-2-3. When the stakes were high enough, however, Lotus mobilized sufficient programming talent to overcome most hardware and operating-system limitations. They got *Release 3* to run in DOS.

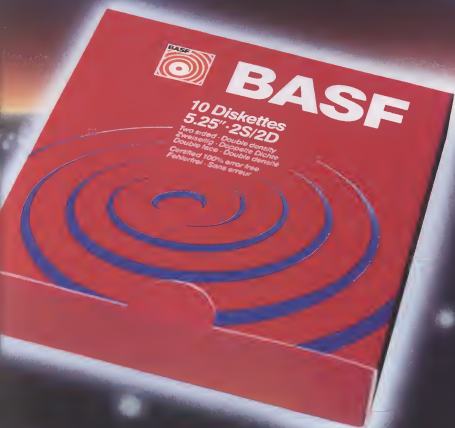
Of course, Lotus has enormous influence as a standard-setter in the marketplace. If Lotus Development Corp. insists that spreadsheets should remain character-based, millions of 1-2-3 users will go along with the idea—at least for a few more years.

But graphical spreadsheets won't go away just because Lotus ignores them. If anything, the competition will only get faster and better, as other developers keep chipping away at technological obstacles that Lotus now insists can't be solved. And if Lotus waits too long to join the graphical mainstream, it's even possible that *The Spreadsheet of the Future* won't be 1-2-3 at all. ■

Jeffrey Tarter is publisher and editor of *Softletter*, a software-publishing newsletter based in Cambridge, Mass.

BARBARA HENSHAW

Now available preformatted
for MS-DOS, Versions 2.0 and higher.



Take the #1 diskette for a test drive.

Pass it around. BASF 5.25" diskettes have been independently rated #1 in performance in test after test. Error-free performance warranted for life accents the BASF commitment to technological leadership and business solutions. Call 800-343-4600 for details and the name of your nearest supplier.

Depend on it.



BASF

FIXED ASSETS.

It's Our Business

Fixed Asset management is getting even more complicated every year. That's why thousands of businesses and accounting firms count on Best Programs' Fixed Asset System to handle all their needs now . . . and in the future.

But don't take our word for it. You be the judge with our 30-day FREE trial. And we'll also send you a free copy of *Best Programs' Guide to Depreciation*—just for trying our program.

If you agree that the Fixed Asset System is a worthwhile investment, simply keep the program and we'll invoice you for just \$695. If it's not for you, just return the program within 30 days with no further obligation. And keep the depreciation handbook as our gift.

So why wait? Order your 30-day free trial today.

1-800-368-2405 (in Virginia, 703-820-9300)

All New
Version 5.0

✓ 4562
✓ TRA86
✓ AMT
✓ FASB 96
✓ SHORT YEARS
✓ GAAP
✓ MID-QUARTER
CONVENTION



Your 30-Day FREE Trial Offer



Please send me the Fixed Asset System to try for 30 days and my free copy of *Best Programs' Guide to Depreciation*.

Name

Company

Address

City State Zip

Phone ()



BEST PROGRAMS

"The Quality Software Company"

2700 S. Quincy Street
Arlington, VA 22206
1-800-368-2405
(in Virginia, 703-820-9300)

00067

(Runs on IBM PCs and compatibles with 640K memory)